NOVEMBER, 1955

Traffic Engineering

Aerial View of Roseburg, Oregon

- Seattle's Radar Signal Installation
- Study of Multilane Crown Design
- A New Signing Approach
- Economic Analysis of the One-Way Grid in Roseburg, Oregon
- Are Advertising Signs Near Freeways Traffic Hazards?

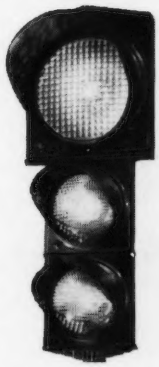
Official Publication of the Institute of Traffic Engineers

NEW 12″ LENS
CROUSE-HINDS TYPE H
TRAFFIC SIGNAL
CONVENTIONAL
8″ LENS SIGNAL

New 12" TRAFFIC SIGNAL BY CROUSE-HINDS

Saves Lives! New to the U. S., but used and proved effective in Canada for several years, this kingsized traffic signal definitely reduces accidents at critical street intersections and along high-speed highways. Bigger and with 3 to 4 times greater light output, its conspicuousness impels more motorists to start decelerating sooner and to obey the stop light.

Similar in construction to the conventional 8" lens signal, the Crouse-Hinds 12" signal uses lenses which meet the ITE specifications for color — has a dust-tight optical system — an adjustable lamp receptacle to take lamps ranging in power from 60- to 250-watts. *More details in free Bulletin sent on request.*



Now in Use in:
Canada: — on the 100-mile Queen Elizabeth Way from Niagara Falls to Toronto . . . City of Toronto
United States: — District of Columbia . . . Virginia . . . New York City (approach to Holland Tunnel)

Now Being Tested in:
Canada: — British Columbia
United States: — Rhode Island . . . Ohio . . . Michigan

● Unitized construction so that you can stack three 12" sections (Type H) or one 12" and two 8" sections (Type K). Walk, wait and arrow lenses available. Multi-faced signals for 2, 3, 4, 5 or 6 directions can be formed. All types of attachments now available for 8" size also available for 12".

A NATIONWIDE DISTRIBUTION exclusively through ELECTRICAL DISTRIBUTORS

CROUSE-HINDS COMPANY
SYRACUSE 1, N. Y.

OFFICES Birmingham Boston Buffalo Chicago Cincinnati Cleveland Dallas Denver Detroit Houston Indianapolis Kansas City Los Angeles Memphis Milwaukee New Orleans New York Philadelphia Pittsburgh Portland, Ore. St. Louis St. Paul San Francisco Seattle Tulsa Washington RESIDENT REPRESENTATIVES Albany Atlanta Baltimore Bangor Bluefield Charleston Concord Detroit Kansas City Los Angeles Memphis Minneapolis Newark Omaha Philadelphia Pittsburgh Portland, Me. Providence Richmond Rochester Salt Lake City San Francisco Seattle Syracuse Washington
Crouse-Hinds Company of Canada, Ltd. Toronto, Ont.

TRAFFIC SIGNALS • CONDULETS • FLOODLIGHTS • AIRPORT LIGHTING

3 words describe PARK-O-METER

1 SIMPLE

2 VERSATILE

3 POSITIVE

The unique mechanical principle which has made Park-O-Meter today's leader . . . now used in nearly 1200 cities throughout the world . . . is readily described and easily understood.

Ask us to show you "what makes Park-O-Meter tick"

Magee-Hale
PARK-O-METER COMPANY

Traffic Engineering

OFFICIAL PUBLICATION OF THE INSTITUTE OF TRAFFIC ENGINEERS

VOLUME 26 NOVEMBER, 1955 NUMBER 2

PUBLICATION STAFF

M. MANSFIELD TODD
Editor

ADOLF D. MAY, JR.
Managing Editor

Associate Technical Editor
MARTIN C. STARK

Associate Editors
H. A. BARNES
J. W. CHAMBLISS
C. C. CLARK
L. W. CORDER
R. E. DUNN
A. T. HAYES
E. A. MUELLER
J. S. SAYLOR

INSTITUTE OFFICERS

CHARLES W. PRISK
President

J. CARL McMONAGLE
Vice-President

JOSEPH E. HAVENNER
Vice-President

MATTHEW C. SIELSKI
Secretary-Treasurer

DIRECTORS

KARL A. BEVINS
District Number 5

GEORGE J. FISHER
District Number 4

GORDON K. GRAVELLE
District Number 2

HERBERT C. HIGGINS
District Number 6

ALGER F. MALO
District Number 3

EDWARD G. WETZEL
District Number 1

HARRY PORTER, JR.
Immediate Past President

In This Issue

Seattle's Radar Signal Installation 59
E. E. Lewarch

A Study of Multilane Crown Design 62
Robert J. Ratner

A New Signing Approach 65
G. R. Cysewski

Economic Analysis of the One-Way Grid in Roseburg, Oregon 67
Donald N. Johnson

Are Advertising Signs Near Freeways Traffic Hazards 71
Ross T. Shoaf

Traffic News 80

New Appointments 82

Institute Affairs 84

Miscellanea 88

Positions Available 88

Section News 89

Looking Ahead 91

Strictly Business 94

Index to Advertisers 96

COVER: Aerial view of Roseburg, Oregon, which is located on U. S. 99 in the basin between the Cascade and Coastal Ranges in southwestern Oregon. Roseburg is the county seat of Douglas County and has a population slightly in excess of 10,000. A one-way grid system was established in 1952 and an economic analysis of the grid system was made by the Oregon State Highway Department. A description of this study is included in this issue.

DEFINITION: Traffic Engineering is that phase of engineering which deals with the planning and geometric design of streets, highways, and abutting lands, and with traffic operation thereon, as their use is related to the safe, convenient, and economic transportation of persons and goods.

Published Monthly by the

Institute of Traffic Engineers

INCORPORATED

PUBLICATION office:
Interstate Printing Corp.
400 Watchung Avenue
Plainfield, New Jersey

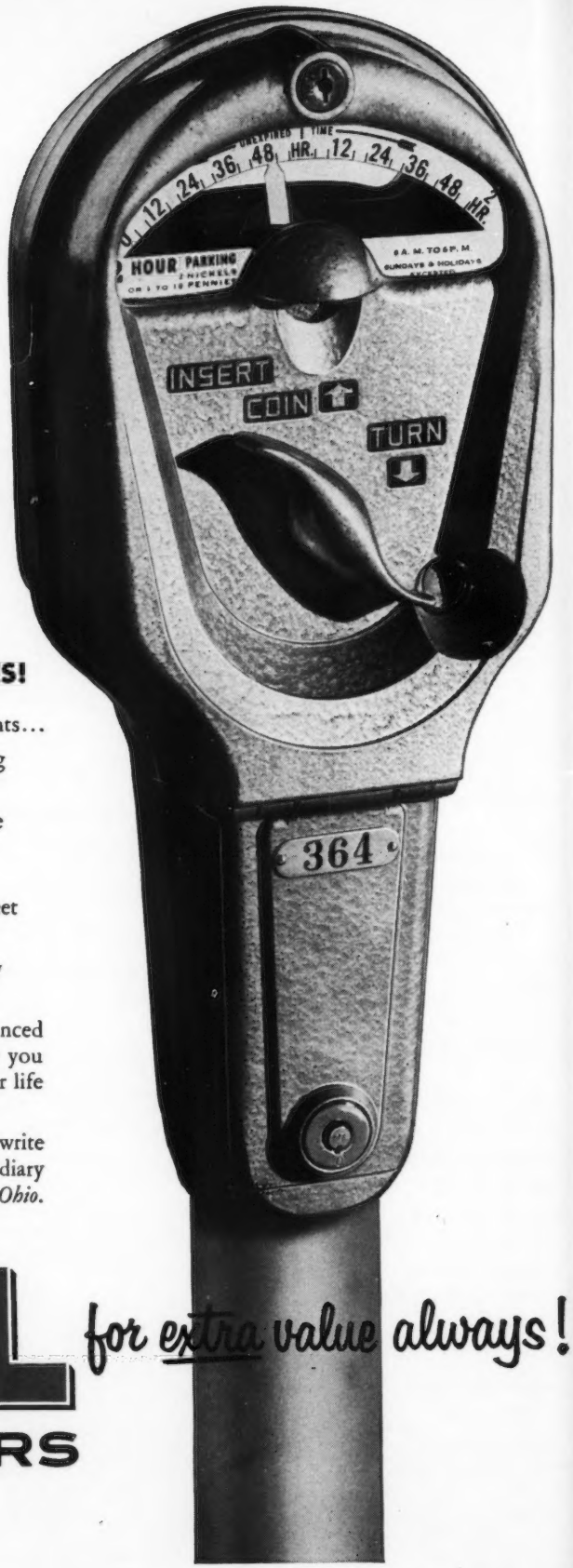
EDITORIAL AND ADVERTISING offices:
Strathcona Hall
New Haven 11, Connecticut

Entered as second-class matter November 7, 1941, at the Post Office at Plainfield, New Jersey, under Act of March 3, 1879. ¶Single copies 40 cents, subscription price $3.50 per year in the United States; $4.75 per year to foreign countries. Other publications of the Institute of Traffic Engineers include Annual Proceedings, Traffic Engineering Handbook and Technical Bulletins.

¶The Institute is not responsible for any statements made or opinions expressed in its publications. Publication of advertising does not constitute Institute approval or endorsement of the products or services advertised. Permission to reprint contents with customary credit line is given unless otherwise stated.

We've gone all out to give you the finest of manuals in the new

DUAL MANUAL



COMPARE THESE UNMATCHED FEATURES!

EXTREME SIMPLICITY—only three moving components...

LOWEST MAINTENANCE EVER—all but eliminating wear, repair or need for adjustment . . .

FOOL-PROOF COIN ENTRY—practically impossible for foreign matter to damage working parts . . .

POSITIVE, FLEXIBLE OPERATION—Seth Thomas movement, with time and coin convertibility to meet every need . . .

WEATHER-PROOF CONSTRUCTION—unaffected by the most extreme weather conditions.

This gives you only a partial idea of the advanced engineering applied to Dual Manuals . . . to offer you a *quality* meter and a new high in trouble-free meter life . . . for unmatched performance and top earnings!

For complete information on Dual Manuals, write today to *The Dual Parking Meter Company* (Subsidiary of The Union Metal Manufacturing Co.), *Canton 2, Ohio.*

DUAL PARKING METERS

for extra value always!

Frankly Speaking

MECHANIZATION IS A PROCESS well recognized in our technological environment. The imaginative and skilled applications of the abiding principles of mechanics have steadily raised production and living standards to all-time highs, judged by materialistic criteria. No small credit is due the engineering professions for these accomplishments, but mechanization is not the focal point of this editorial. Rather, it is to draw attention to a new mechanization requirement thrust upon us as a consequence of the currently short supply of engineering manpower.

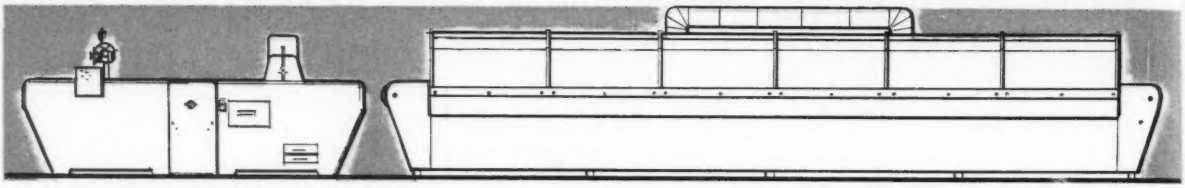
The motivation for traffic engineering is largely in the need for making better use of existing streets and highways. This idea requires some extension if we accept as authoritative the recent estimates of the growing deficiency in the number of engineers entering the profession. It is evident that better use must be made of existing professional manpower.

The typical traffic engineer works in an ever-widening realm. He not only has the difficult role of engineer-artist, but must also be qualified in public speaking, statistics, psychology, technical writing, and in just plain pleasing people, to mention only a few characterizations. If traffic engineering is to retain its most cherished value—that of applying engineering logic and principles to aid the circulatory functions of our highway transportation system—the nonprofessional and subprofessional aspects of the engineer's responsibility should be recognized for what they are.

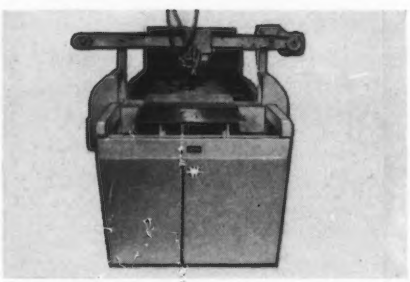
To an increasing extent, the traffic engineer will have to find ways to mechanize these allied tasks, using appropriate personnel, modern machine equipment and instrumentation, more efficient field and office procedures, and other available assistance. The man-hours of engineering thus saved can then be directed to problem areas where that science holds the promise of valuable solutions.

The encircling shortage of engineers brings the necessity for such action closer each year. Future traffic engineering successes may well depend as much on the ability to mechanize and to make better use of manpower as on the ability to devise means for making better use of our streets and highways.

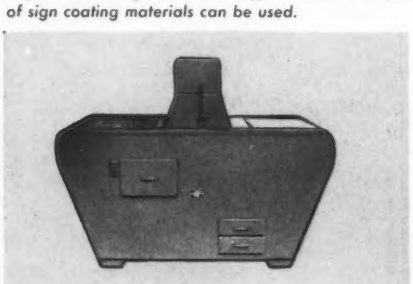
Sheldon W. Stark
President



AUTOMATION comes to TRAFFIC SIGNS!



THE WALD AUTOSPRAY . . . *applies a uniform film of paint on the sign surface. All types and consistencies of sign coating materials can be used.*



THE WALD AUTOREFLECTOR . . . *deposits glass spheres with metered accuracy onto the previously sprayed binder.*

THE WALD AUTOBAKE . . . *seasons and bakes the sign from the inside out. Independent heat zones insure perfect control of the baking process.*

NEW WALD AUTOMATIC SIGN SHOP

Greater Uniformity, Faster Production, Lower Cost

. . . These three benefits that automation is bringing to many industrial products can now be realized on your traffic signs.

The Wald Automatic Sign Shop outmodes all previous methods of preparing sign blanks for the printed message. Your signs move through the various mechanical operations smoothly and quickly on a production line that delivers the last sign just as uniformly perfect as the first. Three sectional units make up the Wald Automatic Sign Shop—the Autospray, the Autoreflector and the Autobake. Each unit may be purchased separately or in any combination desired.

For full information write:

WALD INDUSTRIES
INCORPORATED
Huntingdon, Pennsylvania

Seattle's Radar Signal Installation

By E. E. Lewarch (Assoc. Mem., ITE)
Traffic Engineer, Seattle, Washington

Fig. 1
Photo taken just prior to the installation of the radar detector units at 4th Ave. S. and Airport Way, looking west on Airport Way. Bridge structure makes pressure or magnetic detectors impractical to install. In the foreground is the intersection of 5th Ave. S., Airport Way and Dearborn St.

THE CITY OF SEATTLE last March installed radar detectors to control a volume density traffic signal controller, the first commercial installation of its kind at a permanent location. Seattle's unique location between two large bodies of water, Lake Washington on the east and Puget Sound on the west, gives the city a distinctive hourglass shape. The largest residential areas of Seattle are in the northern portion of the city, while in the southern portion is an industrial area containing a variety of smaller manufacturing plants, large shipyards, steel fabricating plants, and the large Boeing Airplane Company factory which alone employs over 35,000 persons. The central business district is located in the stem of this hourglass between the large residential area to the north and the industrial area to the south. As the majority of residents live in the northern portion of Seattle and work in the southern portion, the major flow of traffic is in a north-south direction and is funneled through the narrow isthmus at the central business district. Consequently the burden of handling the large volume of traffic which daily flows through the main business district falls upon a limited number of streets.

When the use of radar detectors as a means of traffic control was first announced, traffic engineers in Seattle felt that perhaps this was the answer to an unusual traffic control problem at the intersection of Fourth Avenue South and Airport Way, located on the southern fringe of the central business district.

Fourth Avenue South, the business route of U. S. Highway 99, is one of the north-south arterials carrying a large volume of traffic through the central business district. This street passes over the Union Depot passenger terminal on a bridge structure. At the south end of the passenger terminal traffic, 4th Avenue South intersects with that of Airport Way (U. S. No. 10) which carries traffic from the Lake Washington Floating Bridge to the central business district. Approximately 54,300 vehicles enter this "T" intersection on an average weekday (see Figure 1).

During the peak hours traffic flow through this location defies classification into the usual "inbound-average-outbound" pattern. For example, during the evening rush hours the direction of major flows reverses itself during a 15-minute period and changes direction three times. The first peak is southbound, consisting primarily of swing-shift workers heading for Boeing Airplane Factory, the shipyards, and the steel plants. A short time later the major traffic flow is northbound, consisting largely of workers on the day shift at these plants heading for home. The third peak traffic flow is once again in a southbound direction, made up of office workers and shoppers in the central business district who reside in residential districts to the southwest and southeast.

On Fourth Avenue South, north of Airport Way, it is necessary to have two of the four lanes on Fourth Avenue South as storage lanes of considerable length to handle the southbound left-turn movement onto Airport Way. Two of the three approach lanes on Airport Way are designated for right turn movements and one lane for a left-turn movement. The south approach on Fourth Avenue South provides for the movement of through traffic in three lanes and allocates one lane for right-turn movement only.

For several years the Traffic Signal Design Section of the Traffic Engineering Division had wrestled with the problem of converting the fixed-time traffic control at this congested intersection to traffic-actuated control, but the difficulties and expense of installing vehicle detectors had postponed the project. The installation of pressure detectors would have involved extensive compressor work to cut into the 24-inch reinforced concrete deck of the Fourth Avenue South bridge structure, as well as considerable mechanical difficulty with such an installation in the massive steel girders of the Airport Way portion of the structure. Another problem to be considered was that of detouring traffic during the installation of pressure pads on the bridge structure. The blocking of even one lane during the rush hours would cause an enormous traffic jam and yet the detouring of a portion of this large volume of traffic on other routes would be impractical, if not impossible.

Since approximately twenty-five per cent of the total south bound volume of traffic makes a left-turn movement at this intersection, accurate detection is required to separate turning movements from through movements. With lane widths of 10 feet the use of magnetic detectors operating through 24 inches of reinforced concrete has not proved successful. In addition, the Chicago, Milwaukee, St. Paul and Pacific Railroad maintains a 3000-volt D. C. trolley wire under this structure for the operation of transcontinental passenger train electric engines. Thus magnetic detector circuits in the structure are subject to false calls when train movements in the area require the use of high voltage.

Fig. 2
Looking west on Airport Way toward 4th Ave. S. Radar detector unit on right controls a double lane right turn movement. Second detector controls single lane left turn movement.

Fig. 3
Radar unit used to detect two left turn lanes on 4th Ave. S. approaching Airport Way from the north.

The problem of overcoming these obstacles and achieveing maximum efficiency at this major intersection had long been a headache to the Traffic Engineering Division. Therefore when the possibility of using radar units on overhead mountings to detect vehicular traffic was first announced this seemed to be the long hoped for answer to the problem. Radar detector units were ordered and upon their arrival construction was started on this project.

Operational requirements of the intersection made it necessary to install one unit to detect a single-lane left turn adjacent to another unit detecting a double-lane right turn on the Airport Way leg of the intersection (see Figure 2). A third unit was installed to detect two left-turning lanes from the north and a fourth unit was installed to detect vehicles moving through in three lanes from the south (see Figure 3).

One of the questions asked about radar detection equipment was relative to its sensitivity. The unit transmits a wave pattern that is cone-shaped. The frequency of the transmitted wave is 2455 megacycles determined by a cavity oscillator. Transmission is continuous and as a vehicle enters the cone of influence the transmitted wave experiences a Doppler shift in frequency. The receiver portion of the detector, which is constantly comparing the transmitted wave with the reflected or received wave, notes the change in the reflected frequency and passes this information to the signal controller as one vehicle count. Sensitivity of this detector then must be such that it will detect only one lane of traffic. By adjusting the sensitivity control on the units it was found that the cone of influence could be narrowed to detect vehicles in one lane alone, without detecting vehicles in adjacent lanes, or could be broadened to include vehicles in three lanes.

The radar detectors have been mounted at a height of 17 feet above the pavement. (See Figure 4). The problem of suspending the detectors over left-turn lanes where the roadway is 68 feet wide was solved by attaching a clamp to the lower portion of the detector and then fastening the clamp to a double messenger span wire. (See Figure 5). The original mast arm fitting was replaced by a weatherhead for cable entrance. By placing the clamp around the lower portion of the detector the top is kept free for easy removal of the unit and at the same time a more rigid mounting is obtained. (See Figure 6).

The use of radar detectors at this location has resulted in considerable savings when compared with the average pressure-sensitive detector installation. Four radar units were sufficient to cover the same area as would have required eight pressure or magnetic detectors. The disruption of traffic was held to a minimum as there was no excavation or concrete work.

Following is a comparison of approximate costs of installing radar detectors and pressure detectors at this intersection:

Material	*Radar Detector*	*Pressure Detector*
Detectors	$1400.80	$1228.88
Span wire	19.80	
Spreader arms	34.90	
Steel pole bands	3.00	
16-ft. mast arm	15.99	
35-ft. wood pole	32.34	
Concrete		203.40
¾″ conduit		34.80
¾″ conduit ell		5.00
(Total Material Costs	1506.83	1472.08)
Labor		
Lineman	86.40	432.00
Traffic Signal Serviceman	36.96	184.80
Line Foreman	24.08	180.60
Sign Foreman		93.60
Maintenance Laborer		229.40
Laborer		207.08
Blacksmith		36.48
(Total Labor Costs	147.44	1363.96)
Equipment		
Line truck	64.00	320.00
Truck		320.00
Pick-up	6.00	30.00
Compressor		84.00
(Total Equipment Costs	70.00	754.00)
Total Installation Costs	$1724.27	$3590.04

Fig. 4
Radar unit on mast arm mounting detecting vehicles in three lanes of through traffic.

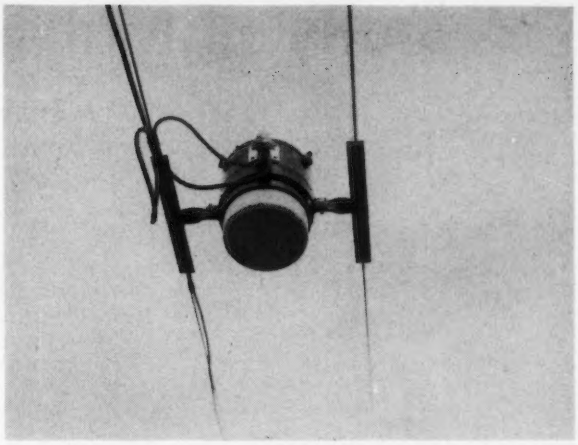


Fig. 5
The problem of suspending the detectors over left turn lanes was solved by attaching a clamp to the lower portion of the detector and then fastening the clamp to a double messenger span wire.

These estimated costs for installing pressure detectors do not make any allowance for unexpected difficulties in concrete removal work.

A three-phase volume-density type of signal controller was installed in conjunction with the radar detector installation at the intersection and a separate control box, containing fuses for every circuit, was also installed. The separate fusing of every circuit permits the traffic signal maintenance crews to work on any individual electrical circuit without completely disrupting the normal operation of the traffic signal.

The volume density controller installed at Fourth Avenue South is interconnected with a three-phase controller at the adjacent intersection on Airport Way at Fifth Avenue South by use of a synchronous device. This interconnection of the density-type controller with the three-phase actuated control permits an offset between the controls which provides a progressive movement for the left-turn traffic traveling from the north on Fourth Avenue South to the east on Airport Way through the intersection at Fifth Avenue South. The volume pattern at the intersection of Fourth Avenue South and Airport Way is such that any cycle developed at that intersection will be adequate for the movement of vehicles at the adjacent intersection and yet allows the timing of the intersections to be set to accommodate their respective traffic demands.

Frequent checks at this intersection reveal that delay has been considerably reduced. In fact it might be said that this intersection control is proving to be too efficient. Vehicle movement is so expedited at this intersection that at times a considerable back-up of vehicles occurs at adjacent intersections nearly 1000 feet away which are supervised by the central business district master control.

Our experience indicates that this type of detection equipment meets a need that has long existed in the field of vehicle detection.

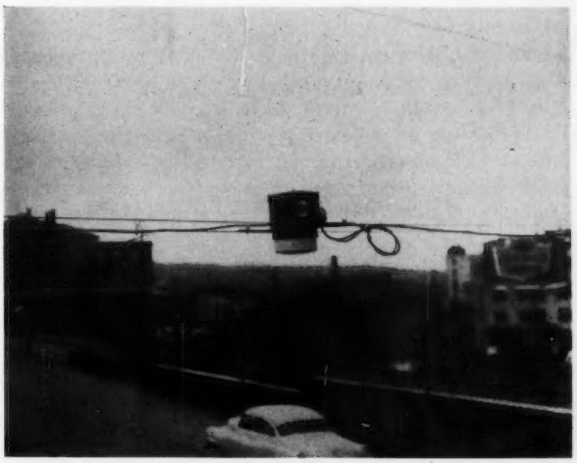


Fig. 6
Side view of radar detector unit mounted on double messenger span wire.

Inventor Adler Proposes Cabinet Post

Baltimore newspapers for November 5 report that Charles Adler, Jr. (Affil. ITE) has urged President Eisenhower to establish a Cabinet post of Secretary of Traffic Safety. Mr. Adler has received more than 50 patents for inventions developed during the last three decades, including sound actuated traffic signals, traffic actuated speed control signals, improvements to railroad signal equipment, blinking position light system used by all commercial airlines and many other devices.

Mr. Adler said his long study of the traffic safety problem has convinced him that an attack on the problem at State level is not nearly enough—the situation demands a national "czar" to standardize control measures and enforce them. Somewhat the same functions are performed in the railroad field by the Interstate Commerce Commission and the aviation is well regulated by the Civil Aeronautics Authority, he added.

Making his proposal as a member of the Maryland Safety Commission formulating plans for the national Safe Driving Day (S-D, Dec. 1), Adler's telegram to the White House said:

"In the interest of traffic safety, I respectfully urge the appointment of a Secretary of Traffic Safety of Cabinet rank to establish and enforce standards of drivers' training and behavior and automobile safety design.

More motorist's lives are lost in the course of a year than are the lives of our soldiers in a major war. We have a Secretary of Defense who is a member of the cabinet. So why not have a Secretary of Traffic Safety who would also be a member of the cabinet?"

A Study of Multilane Crown Design

By Robert J. Ratner (Assoc. Mem., ITE)
Highway Engineer, Rader Engineering Co., Miami, Florida

Courtesy of Concrete Highways Magazine

Fig. 1
Highway with narrow median — one-way crown — U. S. 99, Cowlitz County, Washington.

INVESTIGATIONS OF PRACTICES followed by 32 agencies responsible for establishing design criteria, including 24 State Highway Departments, showed a wide variance in design procedure of the method used in crowning multilane divided highways on tangent sections. The purpose of this study was to ascertain the various methods used, report the comments and criticisms of the various agencies and, from the data assembled, to ascertain the advantages and disadvantages of the different methods used.

The conventional two-way, two-lane road is crowned about the centerline and slopes both ways from centerline towards the shoulders. Cars traveling in either direction have, in effect a transverse slope which is usually uniform down to the right. Thus it would seem logical that a multilane divided highway would be merely a continuation of the cross slope to the right the driver is used to, with extra lanes added and a median placed between opposing lanes of travel. However, as shown in Figure 3, this investigation disclosed six different methods of crowning divided highways, and as tabulated in Table 1, surprisingly few states used the method as just described.

For purposes of this report, it will be more convenient to resolve the six methods of roadway crowning into two categories: one-way crowns and two-way crowns. One-way crowns are those roadways which slope transversely from the inside edge of pavement to outside edge (Figures 1 and 1) and may, as conditions warrant, have a steeper pitch to outer lanes. Two-way crowns are those roads which are crowned at any point between pavement edges and have a slope away from the crown in both directions (Figures 1c, 1d, 1e and 1f).

Highways With a Narrow Median

Results of the study showed that those agencies which still had occasion to design highways with a narrow median (up to 12 feet in width between inner pavement edges) were almost universal in the practice of using a raised median and a one-way slope toward outer pavement edge. Primarily, the one-way slope is dictated by economics of drainage facilities and since this practice is almost without exception today, further discussion here is not considered necessary, particularly since the trend is away from narrow medians in all but the most built up metropolitan areas.

Highways With a Wide Median

A wide median on a divided highway is considered in this study to be any median over 12 feet in width and ranging up to as much as a reported 1,000 feet, varying with each agency's individual standards. The median is usually depressed although in the lower range of width there were some cases reported of a raised median.

1. *Comfort and Riding Qualities:*

Although comfort and riding quality cause automobile manufacturers to expend millions of dollars for engineering, it is interesting to note that not a single agency contacted reported any studies or any knowledge of studies in the field of crown location with relation to comfort, riding quality, vehicle lane placement or driver habits. Crown location was reported based solely on opinion, observation and duplication of practices as used by others in the admitted absence of better sources. However, as can be shown, there is still a wealth of data which can be assembled and analyzed to arrive at some conclusions for crown design recommendations.

AASHO[1] reports that "vehicles are built with a symmetrical caster-camber arrangement for pavements that are level transversely . . ." and, as a result, the relatively small pitch of a 1½% cross slope is to be considered negligible. However, according to the automobile manufacturers, the front-end alignment is adjusted at the factory to compensate for pavement cross-slope. This adjustment is + ½° camber to the left front wheel while the right wheel remains vertical. Past practice has been —¼° on the right wheel and + ¼° on the left wheel. In addition, it was found that dealers, garages and service stations possessing factory specifications adjusted re-alignment of front ends to this same differential.

What this represents to driver comfort and riding quality can be shown by the following analysis. If a car is aligned to ride perfectly on the "right-hand" of a road, as it appears all cars are, it has a built-in crown compensation of 1½% (assuming this value as the common standard for most multilane roads). Thus, on a perfectly flat pavement, this built-in compensation would tend to pull a vehicle to the *left*. When a vehicle rides on the "left-hand" side of the road, the negative crown (to the left) must be added to this −1½% or to the built-in

[1] American Association of State Highway Officials—"A Policy on Geometric Design of Rural Highways," 1954, page 190.

Courtesy of The Highway Magazine

Fig. 2
Highway with wide median — two-way crown — New Jersey Turnpike near Jamesburg, New Jersey.

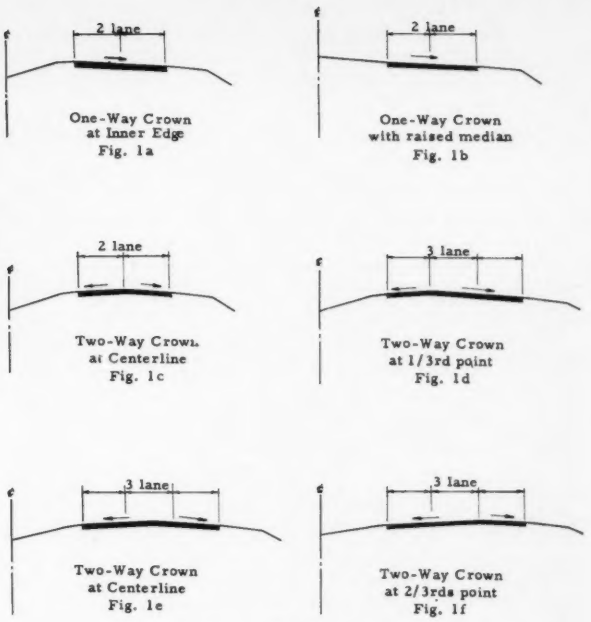


Fig. 3
Typical sections showing various crowns.

compensation and the sum result is a total crown effect equal to a 3% slope to the left. The AASHO advises that a crown effect of this amount is undesirable and will affect driver characteristics.[2] Because the overwhelming majority of roads in the United States are two-lane roads with a two-way crown, it is unlikely that the automobile manufacturers will change their method of front end alignment.

Another factor to be considered on a two-way crown is the "roll-over" effect which occurs when changing lanes. This was considered undesirable by both the automobile manufacturers and several states who favored a one-way crown. In addition, one state noticed a tendency of vehicles, especially trucks, to straddle the center of a two-way crown instead of remaining in their proper lane, and for this reason, favored the uniform, one-way crown.

Perhaps the most interesting objection to the two-way crown can be shown with the following example. Many design criterias do not call for superelevation or alteration of roadway crown when the radius of curvature exceeds a given figure, varying from 5,000′ to 10,000′, depending on design and speed and other factors. With a multilane divided highway with a two-way crown (Figs. 1c, 1d, 1e and 1f) and a large, flat curve ahead to the right, not requiring superelevation, it is possible that a vehicle in the left lane (fast lane) curving to the right will, in effect, have a negative superelevation of —3% due to the crown slope in the left lane to the left and the built-in crown compensation on the vehicle, as heretofore discussed.

While, at first glance, this may appear to have a negligible effect on a vehicle, the relation of safe speed to design speed undergoes a marked change, as this example:[3]

Design speed	70 mph
Minimum radius w/o superelevation	7501′
Friction Factor (dry pvmt.)	0.08 (for 100 mph)
Safe speed-normal (1½%) crown	103 mph
Safety Factor (SS/DS)	1.47
Safe speed-negative (—3%) crown	88.5 mph
Safety Factor (SS/DS)	1.26

If the pavement is wet or iced, the friction factor is substantially reduced. Assuming that the side friction factor due to rain is reduced to 0.07, the following occurs:

Design speed	70 mph
Radius	7501′
Friction factor (assumed)	0.07
Effective superelevation—left lane	— 3%
Safe speed—left lane	66.9 mph
Safety factor (SS/DS)	0.96

The result is an interesting speculation on highway safety. While many other factors enter the picture, such as condition of the vehicle's tires, it does indicate that the effort that goes into modern highway design to provide utmost safety is sometimes nullified by design standards that are shortsighted. If a two-way crown is used, it would be expedient to always call for the crown to be reversed in direction of the curve, even when the radius is large enough so as not to require superelevation. However, this is not the practice used by many agencies as inspection will disclose.

In summary, from the standpoint of providing the maximum comfort and riding quality to the motorist, the one-way crown appears to have definite advantages over the two-way crown due to the fact that vehicles are aligned to ride on a one-way crown, the absence of "roll-over" effect and a better ride on certain types of curves.

2. *Drainage Details:*

The primary reason for the use of one crown shape over another apparently was the drainage factor although, from the replies to inquiries received, the reasons were so conflicting as to leave doubt as to the advantages of either method of crowning. Whereas one state of relatively mild rainfall objected to sheet-flow runoff across a one-way crown, three states in regions of heavy rainfall used a one-way crown without raising this point.

[2] "A Policy on Geometric Design of Rural Highways," AASHO, 1954, page 191.

[3] 1954-criteria for Sunshine State Parkway, Florida Turnpike Authority.

And, where several states preferred the two-way crown for purposes of expediting drainage off the pavement, other states favored the one-way crown because apparently keeping medial drainage to a minimum was more important.

Primarily, it was the northern states which preferred the two-way crown due to the fear that melting snow piled in the median would run across the pavements and in addition to providing an immediate hazard, might be subject to quick freezes, leaving an ice-film. Another reason for the two-way crown was the desire to remove all surface waters from the pavement as quickly as possible. One contention was that with a one-way crown, trucks in the outer lanes showered passing automobiles and this was reported to have resulted in several bad accidents. Further, one state thought that there was a definite psychological driver reaction to the film of water produced by the one-way crown.

On the other hand, the one-way crown was thought to have several advantages the two-way crown did not. The desire of keeping the water in the median to a minimum and preventing all pavement run-off from entering was pointed out. One state remarked that the one-way crown was used to enable the water to reach the side-ditches as quickly as possible. Another state pointed out that unless medians were constructed with sufficient width, medial water could wreak havoc with subgrades. In this respect, a third state, in a region of heavy rainfall, reported that one-way crowns are used with all medians less than 40′ in width and two-way crowns with wider medians.

There is little consistency because, in many cases, states with similar climatic conditions used different types of crowns. For example, the two-way crown was favored from a melting snow standpoint but this was prevented, according to four states, not by roadway crown, but by using a depressed median with sufficient swale. Similarly, from one state of heavy rainfall, it was reported that no undue hazard was found on four-lane highways with narrow median strips in superelevating all four lanes uniformly and carrying run-off entirely across all four lanes.

A raised median, while having certain advantages in other aspects, requires dual drainage facilities in the median along inside shoulder edges with both one-way and two-way crowns in order to prevent median run-off and debris from spilling onto the traveled way. Where this is not possible due to insufficient median width, some complaints were received about too much water on the pavement during heavy storms. The raised median also apparently aggravated the problem of snow removal and there appears to be a trend away from this method of design at the present time.

In conclusion, from a drainage standpoint, it would appear that each designing agency would have to carefully examine the climatic features of the area involved in order to ascertain the type of crown to use. Generally, there seems to be a certain advantage in keeping medial water to a minimum, particularly where unrestricted median widths are not possible. Whether there is any reduction in drainage costs due to the reduced water is questionable. With two lanes in each direction, it is not likely that the one-way crown causes too much objection from the standpoint of sheet-flow on the pavement. However, if the facility is composed of three lanes, and particularly four, in each direction, and there may be excessive, prolonged rainfall, some consideration should be given to the two-way crown. If the median can be adequately depressed and has adequate storage space in snow areas there should not be too much of a problem from melting snow in the northerly climates. However, it should be borne in mind that while the two-way crown aids the motorist by more effectively removing rainfall from the pavement, as pointed out heretofore, a hazard is introduced by the negative superelevation on certain curves of flat radius.

3. *Design and Construction Features:*

The methods of showing details on contract drawings and of transferring them to actual field construction differs in almost every state and with every agency. However, there is no quarreling with the fact that the simpler the detail, the easier the design and cheaper the construction.

The problem of crown location preference in design appears to be primarily that of handling superelevation detail. Although some plans indicate superelevation details by means of a standard line diagram, others actually show a plotted profile of the various pavement edges through the transitions from tangent to curve (and vice versa) as an aid to field forces. The argument for indicating more than one profile through the transitions is based on the fact that these grades must be ultimately figured before staking for sub-grade. Computations performed by trained designers in the office, with the aid of multiplace tables and automatic calculators, must perforce be cheaper than the same computations figured in the field. As survey work and construction stake-out is often performed by the same agency performing the design in the office, the saving is reflected back to the originator.

With a two-way crown, through a superelevation transition, it is often necessary to compute the three pavement edges as, for example in a curve to the left, the outer pavement edge is usually brought up first to form a plane section for further rotation. Thus, until a plane section is reached, three grades must be computed at each station. As a one-way crown (with only two edges to be figured) already represents a plane section that can be immediately rotated, the two-way crown represents 50% more design work.

For highways with three or more lanes in each direction and an off-center two-way crown (Figs. 1d and 1f), regardless of where the profile is carried, all curve transitions require the continued calculations of three different pavement elevations — high point, right and left pavement edge.

The one-way crown, regardless of number of lanes, may be rotated in a plane section with only outer and inner edge computed.

The advantage of the one-way crown was also indicated as an aid to simplifying grade calculations and cross section plotting by some states. In the field, there are numerous methods of staking the finished roadbed for placing subgrade and/or for fine grading. However, whether the method requires the actual placing of "blue-top" stakes or taking shots off reference points to the side of the roadway, a two-way crown requires three points to be checked at each station while the one-way crown, with a continual plane section has only two.

(Continued on page 79)

A New Signing Approach

By G. R. Cysewski (Assoc. Mem., ITE)

District Traffic Engineer, Washington State Highway Commission
Seattle, Washington

Fig. 1
View of sign resting on surface of highway. Picture taken from slightly above, to show reduced wind-resistance section.

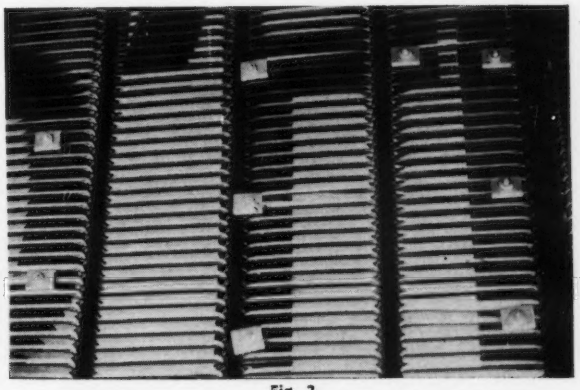


Fig. 2
Method of fastening letters to the louvered section of the sign.

ALTHOUGH THE PACIFIC NORTHWEST is noted for its mild climate occasional wind storms have caused considerable difficulties with overhead suspended signs. In order to attract the attention of the motorist, these signs have been suspended overhead so the conflict of abutting development is reduced. On the existing highways where there is no control of access this is very necessary. This necessity is amplified by the fact that many abutting businesses have installed billboard type of signs and highly illuminated signs that detract from the important shoulder signs indicating restrictions, warnings, or giving direction to traffic. In view of the above it has been necessary to resort to overhead signs, especially on the multiple-lane highways. An economical type of suspension is a messenger wire suspended between two utility-type poles which have been as large as four foot by twelve foot. In wind storms two difficulties have been experienced; the signs standing out at quite an angle in the wind and being nearly invisible to the traveling public and although an infrequent experience, but more serious, these signs have blown down. We have tried several measures, one of which is increasing the messenger size. This did not prevent the signs being blown to an angle. The second alternative, that of securing signs by both the top and bottom has given rise to additional difficulty of these signs "bucking," or oscillating and putting considerable strain on the messengers and consequently the utility poles on each side of the highway.

At other installations where signs have been suspended over the highway through use of a mast arm they continue to swing under wind conditions. Further, we have actually experienced the utility pole being turned in the ground. This could, of course, be eliminated through installation of a heavier pole or through the installation of a pole in a concrete foundation. It is recognized that there are products available for such overhead suspension. However, economical considerations precluded such installations at all locations. Some other means were necessary.

A sign was needed that could resist a high wind storm without damage to the suspension materials and one that would remain visible to the highway. A louvered sign would be the answer, if the louvers were in the direction so that they would be nearly perpendicular to the approaching motorist's eye.

A press stamp dye was found to be available and acceptable. An inspection indicated that a trial was most desirable. The particular dye which was used was one that had been used for large commercial radiator construction. The louvers were not twisted about the central axis, rather they were bent in a manner of hinging about the front face of the sign. The first sign that we tried was the same size as one other existing overhead sign, 32″ x 64″.

The dye which was used was smaller than the desired size of the sign, and it was necessary to make a multiple stamping in order to fill in the 32″ x 64″ sign. The size of the sign is not in any way restricted by the equipment, and could be used to make a 4 by 8 or a 4 by 12 sign.

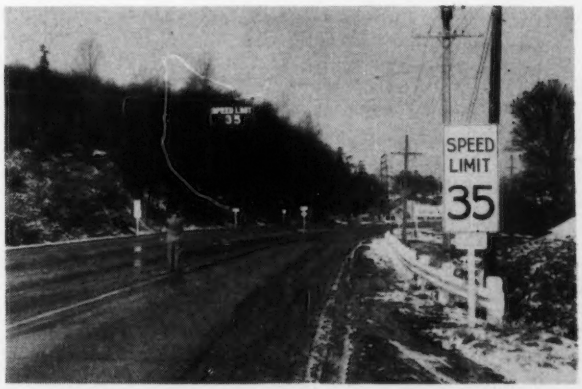


Fig. 3
Sign in place as viewed from approximately 200 feet.

Fig. 4
Sign in place as viewed from 60 feet (sign is 16 feet above pavement).

The sign was constructed of 16 gauge sheet steel, etched, prime coated and finished with two coats of baked enamel. All outside edges were broken back to form a channel 1" by ¾" minimum. No lap welds were permissible. The louvers were in multiples of four in each set. Spacing was 3½" punch with ⅜" space between punches. 1" space was left between each multiple. Stiffeners were provided for between louver multiples on the back side. Louvers were punched on a 30° angle, 5/16" apart, and pierced back at the bottom 5/16".

Figure No. 1 is a view of the sign resting on the surface of the highway and the picture being taken from slightly above the sign, in order to show the cross-sectional area with a slight tilting. This should be indicative of the small wind resistance that the sign would have.

Figure No. 2 indicates the method of fastening the letters to the louvered section of the sign, through the use of small "U"s bent to fit the back side of the louvers. The material used for the legend must have a stiff backing. In the event other than a material with a stiff backing is used it would be necessary to place these letters on some backing material. In this particular instance we used a commercial product that was inherently rigid, and to improve daytime visibility this was installed on a letter of sheet metal larger than the reflectorized material itself.

Observations of this sign, both in the daytime and at night, have indicated very good legibility. The particular purpose of this sign was not so much to investigate the various reflectorized materials, their target value, or legibility but rather to arrive at some product that could be used for overhead suspension without the formerly experienced difficulties in windstorms.

Figure No. 3 is a highway view of the sign in place from the distance of approximately 200 feet. This picture is taken with a normal focal length lens, 35 millimeter camera was used with a 50 millimeter focal length. It is not a telephoto view.

Figure 4 is a view of this sign taken from a distance of 60 feet. The sign was erected with the surface of the sign being 16 feet above the surface of the highway. The light from the sky behind does not show through the sign. This is as we desired, some means of having opacity without wind resistance.

Figure 5 is a rear view of the sign showing the contrast of opacity as compared with Figure 4, the front view.

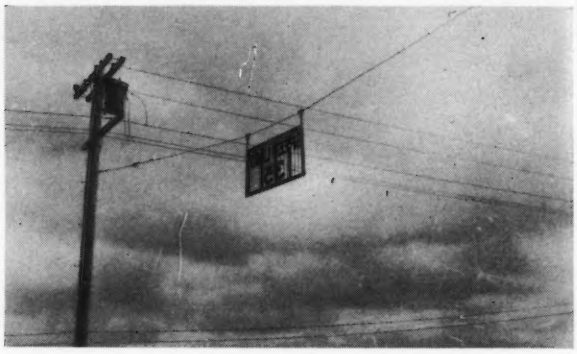


Fig. 5
Rear view of sign.

The last detail that needed to be investigated was the effect of this sign under windy conditions. During one of the storms last winter this sign and one of similar size and suspension on the state highway were observed. This sign had an angle of approximately 10 to 12° from the measurements taken from the surface of the highway. The solid sign had an angle of from 47° to about 52° from the vertical.

The sign was constructed through these box-bend angles that were noted. The outside angles were not separate pieces, rather the sign itself had the angles bent into it and they were then secured on the corners. The reason for using this was to eliminate additional difficulty in construction and joints that might be sources of corrosion. Intermediate and vertical on the signs were three other box-bend angles that were secured to the sign itself through spotwelding. This sign did have a stiffness comparable to a ⅝" plywood sign.

The weight of this sign constructed of sheet metal is 41 pounds. The weight of a plywood sign the same size is 27 pounds. If weight is of a serious consequence the same sign could be erected from aluminum material. The weight would then be comparable to the weight of the plywood sign. This additional weight was not a problem, but rather would add stability to the sign and legibility under severe weather conditions. In view of the experience of this sign moving from the horizontal such a small amount possibly would justify a trial with aluminum. All factors considered, we believe that the small amount of added weight far more than discounts the effect of wind on a solid sign. Optimistic feeling in making this sign was more than substantiated as a result of the observations under storm conditions.

PLEASE MENTION

TRAFFIC ENGINEERING

WHEN WRITING TO

ADVERTISERS

Economic Analysis of The One-Way Grid in Roseburg, Oregon

By Donald N. Johnson

Highway Economist, Oregon State Highway Department, Salem, Oregon

The Traffic Engineering Division of the Oregon State Highway Department conducted a comprehensive survey of traffic conditions in Roseburg, Oregon, during 1954. The survey was conducted at the request of the City of Roseburg and Douglas County, and with their cooperation.

As part of the Roseburg Area Traffic Survey, City of Roseburg officials requested a thorough study of the city's one-way grid system which was established in the Central Business District on December 28, 1952. One phase of the one-way street analysis was an economic investigation of the effect of the one-way grid on business conditions in the Roseburg area. This economic study, taken from the Oregon State Highway Department Technical Report No. 55-4, "Traffic Survey Roseburg and Vicinity 1954," is reprinted in the following article.

Conclusions

THE ESTABLISHMENT of the one-way street system in Roseburg had no apparent effect on business conditions during 1953. While retail sales in the area were lower in 1953 than in 1952, the decline appears to have resulted from a variety of factors other than transportation conditions. The most important cause appeared to be the drop in employment and payrolls in the lumber and wood products industry. Other indicators of business conditions also show that the economy of Roseburg was not affected by the rerouting of traffic. Property values and store tenancy in the downtown area remained firm. Parking meter collections leveled off slightly, while bank debits remained at a high level.

Purpose and Methodology

The purpose of the Economic Study was to determine what effect, if any, the establishment of the one-way street system in Roseburg in December 1952 had on business conditions during 1953. To accomplish this purpose, economic data for 1953 were compared to data for 1952 and 1951.

There is no quick or easy way to measure the effect of the change in street routings on business conditions, since business conditions are dependent on a wide range of factors. In this study an effort has been made to analyze all pertinent data. Gross receipts data for retail stores, made available by the State Tax Commission at the request of the State Highway Department, were analyzed by area and by year. Supplemental comparisons were made of economic conditions affecting retail trade such as changes in employment and payrolls. Before and after studies were made of bank debits, parking meter receipts, property values, and the number of new businesses. An attempt was also made to obtain similar data for receipts of hotels and tourist courts, but sufficient data were not available for inclusion in this report.

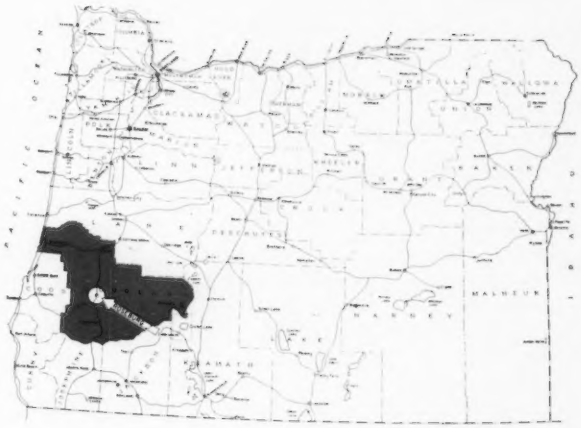


Fig. 1
Location of Roseburg, Oregon.

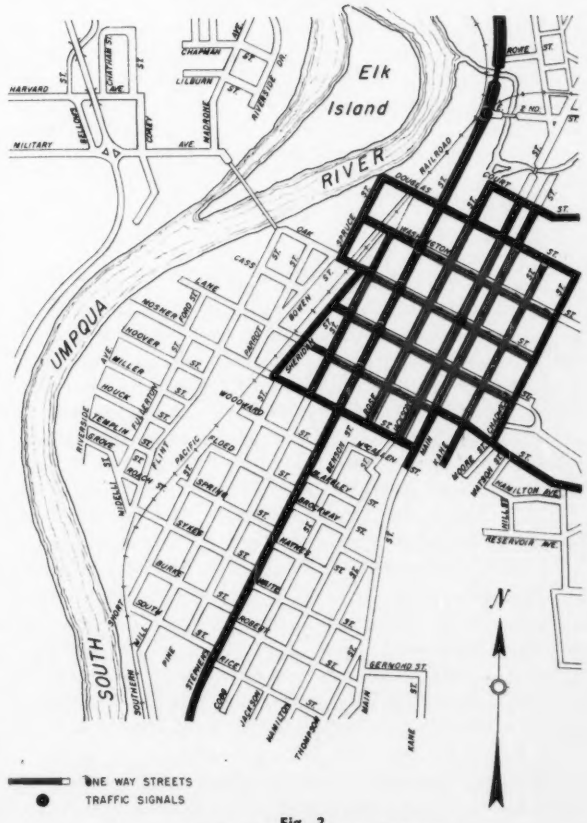


Fig. 2
Layout of One-Way Grid System.

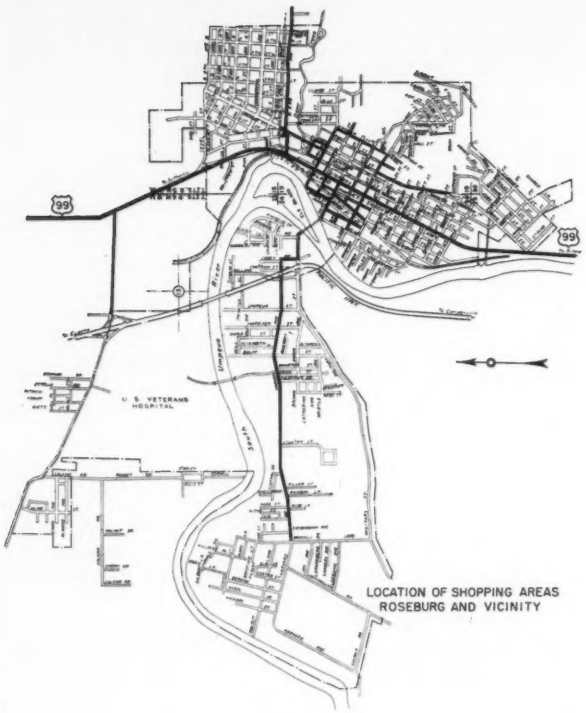


Fig. 3

Fig. 4

For purposes of this report, it has been assumed that the rerouting of traffic in itself would not affect the volume of local spending in the Roseburg Area as a whole, since the retailers have a captive market. That is, there are no other trading centers of comparable size within a competitive distance of the Roseburg Area. There is some possibility that the establishment of the one-way street system may have affected business conditions within the Roseburg Area in two ways.

1. Reallocation of local spending among stores or shopping districts.
2. Reallocation of tourist spending.

Since city-wide retail sales data are not available for Oregon cities except for Census years, it was necessary to make special arrangements with the State Tax Commission to obtain data for this study. The Tax Commission is governed by a secrecy clause which prohibits the release of data for individual establishments; therefore, only percentage change figures for combined groups of stores were available for this study.

Fluctuations in retail sales are caused by a number of economic factors in addition to transportation conditions. Because of this, it was thought that a comparison of Roseburg sales with those of another city of similar size and economy, but without a one-way grid system, would point out such factors. Grants Pass appeared to be the best city for this comparison since it is a city of similar size and economy lying 75 miles south of Roseburg in the adjoining county of Josephine. Tables 1 and II show a comparison of the population, employment, and related data for the two cities.

Additional comparisons were made available by dividing the stores in the two cities into trade areas. These areas, pictured on the maps in Figures 3 and 4 were laid out as follows:

Area I: *Roseburg* stores located within the area of the outside the grid system. *Grants Pass* stores located in the heart of the Central Business District.

Area II: *Roseburg* stores located in the downtown area outside the grid system. *Grants Pass* stores located on the periphery of the downtown area.

Area III: *Roseburg* and *Grants Pass* stores located outside the downtown area, but within the urban area.

Limitations of Data. Complete data for Roseburg and Grants Pass were not available for the sales comparisons. The operations of building materials and automotive establishments were excluded, since these outlets are located mainly outside the Roseburg one-way grid area. In addition, the data were limited in the following ways:

1. The Tax Commission was not able to use a number of 1953 tax returns since they were not processed in time to meet the deadline set for this report.
2. The operations of stores with outlets in other cities were not included.
3. Only establishments in operation during the full three years from 1951-1953 were included.
4. Since tax returns of corporations and partnerships were avalilable to the Tax Commission earlier than the returns of individually owned organizations, special effort was made to obtain complete listings of these establishments, while only a limited number of individually owned stores were included. The listing of individually owned stores was, however, at random —no selectivity was used.

TABLE I

Comparison of Population, Employment, and Related Data for Roseburg and Grants Pass

	Roseburg	*Grants Pass*
1950 Population[1]	8,390	8,116
1950 Employment, Percentage Distribution by Type:[1]		
Agriculture	1%	6%
Mining	—	—
Construction	7%	7%
Manufacturing	24%	21%
Transportation, Public Utilities	8%	7%
Trade: Wholesale, Retail	25%	24%
Finance: Insurance, Real Estate	4%	4%
All Services	25%	26%
Public Administration	5%	4%
Not Reported	1%	1%
Total	100%	100%
Total Persons Employed, 1950[1]	3,545	3,000
Percent of Lumber and Wood Products Covered Employment to Total Covered Employment in 1953[2]	64%	49%
Number of Persons in Trading Area[3]	49,744	31,142

[1] 1950 Census of Population, U. S. Bureau of Census.
[2] Oregon State Unemployment Compensation data based on county-wide figures.
[3] "Editor and Publisher," 1954.

TABLE II

1948 Retail Sales — Roseburg and Grants Pass

	Roseburg		*Grants Pass*	
Types of Establishments	*Number of Establishments*	*Sales Volumes ($1,000)*	*Number of Establishments*	*Sales Volumes ($1,000)*
ALL STORES:	186	$23,363	183	$20,252
Food Group	23	3,952	25	4,193
Eating and Drinking Places	31	1,449	38	1,398
General Merchandise Group	7	3,075	7	1,904
Apparel Group	19	1,391	11	659
Furniture, Furnishings, Appliance	14	1,507	11	777
Automotive Group	18	5,938	19	3,669
Gasoline, Service Stations	23	1,098	18	1,287
Lumber, Building, Hardware	9	898	15	2,987
Drug and Proprietary Stores	5	645	6	N.A.[1]
All Other Retail Stores	37	3,410	33	N.A.[1]

[1] N.A., not available.
Source: 1948 Census of Retail Trade, U. S. Bureau of Census.

Because of the lack of a more inclusive sample of stores, data by store type were not analyzed. However, changes in receipts at retail stores by areas appeared sufficiently consistent and inclusive to provide a reasonable indication of sales trends.

Analyses of Retail Sales Conditions

Gross receipts at retail stores in Roseburg and Grants Pass for 1953 compared with 1952, and 1953 compared with 1951, are shown in Table III. The 1951-1953 data are included for comparative purposes. The one-way street routings were established in December 1952, and were in effect throughout 1953.

Three general observations may be made on the basis of the 1953-1952 data included in Table III.

1. Total retail sales in Roseburg were about six percent lower in 1953 than in 1952, compared with a three percent decline in Grants Pass.
2. Sales in Area I (the Central Business District) in both cities were down by about the same percentage.
3. Combined Area II and Area III sales in Roseburg were down slightly, while sales in the comparable areas in Grants Pass showed a slight increase.

TABLE III

Gross Receipts at Retail Stores in Roseburg and Grants Pass 1953 Versus 1951 and 1952

	Number of Stores Included	*Percent Change 1953 Versus 1951*	*Percent Change 1953 Versus 1952*
		ROSEBURG	
Area I	28	— 3	—7
Area II	8	+ 2	—4
Area III	8	+23	—2
Area II + III	16	+15	—2
Total	44	+ 2	—6
		GRANTS PASS	
Area I	22	— 4	—7
Area II	9	+12	—1
Area III	6	+13	+6
Area II + III	15	+12	+1
Total	37	+ 4	—3

Source: Research Department, Oregon State Tax Commission.

The fact that sales in the Central Business District of both cities were down about the same percent indicates that factors other than transportation conditions were mainly responsible for the decline in Roseburg. The fact that combined sales in Areas II and III in both Roseburg and Grants Pass held up better than Area I sales indicates that there was no significant shift from downtown shopping to suburban shopping or vice versa, resulting from the rerouting of traffic. Had sales in downtown Roseburg been affected by the establishment of the one-way grid, it would be expected that some reaction would have been felt by stores outside the downtown area. These findings are also applicable to the 1951-1953 comparisons, although retail sales in that year were below the level of either 1952 or 1953, both in Roseburg and Grants Pass, and in the State and Nation.

It may be concluded from this information that there is no evidence that the rerouting of traffic either caused a reallocation of spending among shopping districts or produced a change in tourist spending.

Analysis of Economic Conditions Affecting Retail Sales

Retail sales in the Roseburg and Grants Pass Areas in 1953 were influenced by a number of adverse factors. In fact, the retail sales decline was felt throughout the Pacific Northwest. During the first half of 1953, Pacific Northwest retail sales as indicated by department store sales, were above those of the comparable period of 1952, but during the second six months, sales dropped more than five percent below the comparable period of 1952. Apparel store sales in the Pacific Northwest were three percent below the 1952 level and furniture store sales were down four percent according to Federal Reserve Bank of San Francisco data.

The causes of these changes were varied. Prices of some of the more important goods sold at retail stores in 1953, in the Nation as a whole, were slightly below the 1952 level —apparel prices were down by about one percent and house furnishings by a half of one percent. Agricultural prices in 1953 were about 10 percent lower than in 1952, affecting farm income available for expenditure. More important, especially in the Roseburg Area, was the rise in unemployment and the decline in payrolls in the lumber and wood products industry.

Employment and Payrolls

The condition of the lumber industry is particularly important to the Roseburg Area since it is the area's main industrial employer. During 1953, average employment in the lumber industry in Douglas County was about six percent lower than during 1952, and the total employment was down by five percent. The total number of persons unemployed in the Roseburg Area was 56 percent greater in 1953 than in 1952, and over twice that of 1951. These conditions are summarized in Tables IV and V.

TABLE IV

Average Monthly Employment[1] in Douglas County, Josephine County, and Oregon
1953 Versus 1952

	Percent Change	
	Lumber and Wood Products	*Total Employment*
Douglas County	—5.8	—4.6
Josephine County	—8.6	—4.3
Oregon	—4.7	—1.0

[1] In establishments covered by Unemployment Compensation Law.
Source: Oregon Unemployment Compensation Commission.

TABLE V

Estimated Average Number of Persons Unemployed in Roseburg and Grants Pass Areas During 1953 and 1952

	Number Unemployed 1953	*Number Unemployed 1952*	*Increase in Unemployment 1953 Compared With 1952 (Percent Change)*
Roseburg Area	1,321	848	+56
Grants Pass Area	890	720	+24

Source: Oregon Unemployment Compensation Commission.

Lumber and wood products payrolls were affected by the rise in unemployment, causing a drop in the amount available for spending at retail stores in areas dependent on the lumber industry. Lumber payrolls were three percent lower in 1953 than in 1952 in Douglas County, and total payrolls, as shown in Table VI, were three percent below the 1952 level.

TABLE VI

Total Payrolls[1] in Douglas County, Josephine County, and Oregon
1953 Versus 1952

	Percent Change
Douglas County	—2.6
Josephine County	—4.6
Oregon	+2.2

[1] In establishments covered by Unemployment Compensation Law.
Source: Oregon Unemployment Compensation Commission.

Other economic data are available which supplement and support the preceding analysis of retail trade conditions and are discussed hereinafter.

Parking Meter Receipts. A good indication of the number of persons coming into the downtown shopping area as a whole can be determined from parking meter receipts. A comparison of parking meter collections before and after the grid system was established shows that there were no significant increases or decreases in parking meter use as a result of the establishment of the one-way grid.

For the City as a whole, collections per meter fell off slightly in 1953 compared with 1952. The decline during the second six months of 1953 resulted partly from the addition of 40 meters in a relatively unused parking district. These conditions are summarized in Table VII.

TABLE VII

Parking Meter Collections, Roseburg, 1951 - 1953

Period	*Average Number of Meters in Service*	*Meter Collections*	*Average Collections Per Meter Per Month*
	PRE-GRID		
1st 6 months, 1951	698	$20,905.25	$4.995
2nd 6 months, 1951	699	24,125.50	5.749
1st 6 months, 1952	699	24,915.45	5.942
2nd 6 months, 1952	704	25,938.90	6.139
	POST-GRID		
1st 6 months, 1953	679	24,827.20	6.094
2nd 6 months, 1953	721	25,463.50	5.884

Source: City of Roseburg.

Property Values and New Businesses. An investigation of recorded sales of property located in the one-way grid, before and after the establishment of the one-way street system, reveals no apparent changes in values. This is necessarily based on a limited number of transactions, since during the years 1951-1953, only four recorded transactions in the grid area were made.

No records were available which indicated that any retail businesses in the one-way grid area either opened or closed during the year before or the year following the establishment of the one-way street system. However, during the two years immediately following the study period two large retail firms opened Roseburg branches in the one-way grid. In addition, one downtown branch of a national retail firm moved from one location to another, both within the grid.

Bank Debits. Frequently bank debits (Table VIII) are used as an indicator of business activity, since checks written against bank accounts (that is, debits to deposit accounts) amount to about 90 percent of the total payments for all goods, services, and property. Higher debit totals indicate increased business activity. Debits at banks in both cities increased slightly during 1953 compared with 1952. This compares with a slight decrease for Oregon as a whole. In Roseburg, the annual rate of increase was considerably lower during 1953 compared with 1952, than in 1953 compared with 1951.

TABLE VIII

Daily Average Bank Debits in Roseburg, Grants Pass and Oregon
1953 Versus 1951 and 1952

	Percent Change	
	1953 vs. 1952	*1953 vs. 1951*
Roseburg	+0.4[2]	+17.9
Grants Pass	+0.2	+ 5.9
Oregon[1]	—1.2	+ 4.6

[1] Based on Portland, Salem, and Eugene totals.
[2] 1953 estimated on basis of 11 months.
Source: Roseburg and Grants Pass figures from local banks—Oregon figures from Federal Reserve Bank of San Francisco.

Summary

All factors considered, the establishment of the one-way grid did not appear to affect business at Roseburg retail establishments. The drop in retail receipts was caused mainly by the decline in employment and payrolls in the wood and lumber products industry. Other indicators, including parking meter receipts, property values, number of new businesses and business failures, show no changes which could be attributed to the one-way street routings. In fact, changes in bank debits indicate Roseburg business activity at a high level during the year following the establishment of the one-way grid.

Are Advertising Signs Near Freeways Traffic Hazards?

By Ross T. Shoaf (Mem., ITE)
Traffic Engineer, San Francisco, California

DO ADVERTISING SIGNS EXCITE YOU? Would you know if your eyes were subconsciously attracted away from the road by a flashing sign? Do spectacular signs virtually reach out and grab you by the lapel and say "Look at Me"? These questions and many others are being raised because of a new San Francisco Billboard Ordinance intended to protect motorists from signs adjacent to freeways.

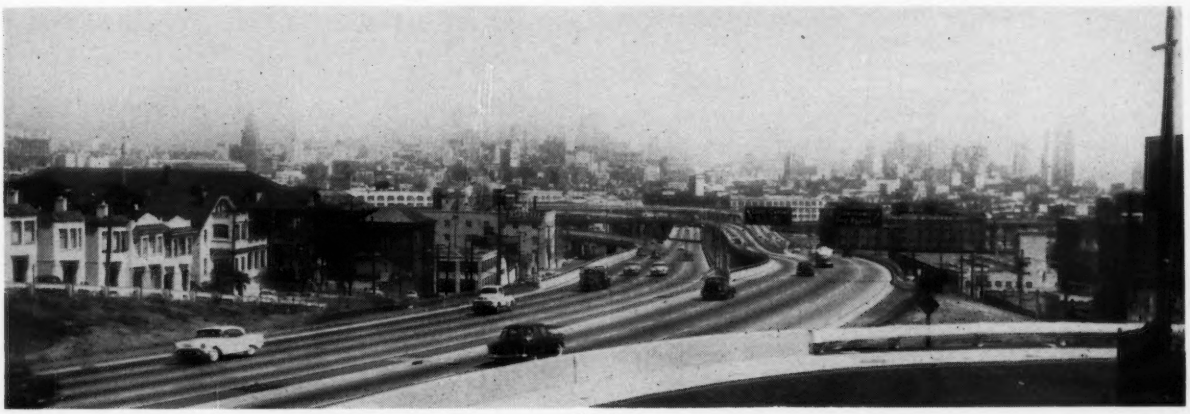


Fig. 1
Bay shore free-way leading north into San Francisco.

With the ever increasing construction of freeways in urban areas attracting tremendous volumes of motorists, there has developed a new and accelerated economic value for advertising signs. The advertising industry, alert to new and profitable business outlets, has been quick to see the potential value of these high volume trafficways in applying their trade.

Many highway and traffic engineers who have spent tremendous amounts of the gas tax monies in the attempt to secure maximum traffic safety in the design of their highways, have raised questions as to whether some of their safety work was being undone by certain types of advertising which could be viewed from the freeways.

The questions raised by these engineers are not the age-old questions of aesthetics and whether advertising signs are conducive to a pleasant background for relaxed driving. More particularly, they have raised the very express question of traffic safety. This question has not resulted from statistical studies of accidents occurring on freeways because statistics have not revealed that advertising signs have or have not been directly associated with accidents which have occurred on freeways. The same engineers point that this fact is to be expected for the simple reason that the fundamental precept of advertising is its impact upon the subconscious mind. Therefore, if an accident has been directly or indirectly caused by the attention of a motorist being subconsciously attracted away from the highway to an advertising sign, he would not, of course, be in a position to testify that the presence of the sign was even a partial cause for the occurrence of the accident. In addition, they point out that it is rare that human nature would ever be found to admittedly confess that an advertising sign distracted him to the extent that as a motorist he became involved in an accident because of his attention to a sign.

Fig. 2
Examples of flood-lighted, non-moving signs.

The same engineers point out, however, that in their studies of traffic design they have found very definite reasons for separating points of decision even at the expense of

hundreds of thousands of dollars. This has been necessary in order that on and off ramps, acceleration and deceleration lanes, etc., be sufficiently far apart so that the motorist will only be presented with the choice of two decisions at one time, will not be distracted from operations on the road, and will have sufficient time to adjust himself before coming up against another choice of decision. Since this type of design has been found essential for constructing safety into our freeways, they conclude that any other distraction which the motorist finds difficult to resist will, to a large extent, nullify the tremendous expenditures of gas tax money for these safety features.

On the other hand, there appear to be a few engineers but more particularly the advertising people themselves who contend that advertising signs actually add safety to our freeways. While most of the studies which have been found in this direction pertain apparently to overall routes and more particularly to rural freeways, the contention is that advertising signs under such conditions break up the monotony of driving with which the motorist is confronted and therefore keeps the motorist more alert. The same people point out that with the many scenic features in urban freeways, particularly exciting and fascinating skylines, the safety which might be lost by distraction to advertising signs is small in comparison with the natural and normal attractions.

In the city of San Francisco, this point has been brought to the attention of traffic engineers by reason of an ordinance effective as of August 15, 1953. This ordinance is designed to regulate advertising structures or signs adjacent to the Bayshore Freeway in San Francisco. In general, outdoor advertising signs are prohibited if they are designed to be seen primarily from the freeway and if they are located within 200 feet of the edge of the right of way, they shall be deemed prima facie to be viewed primarily from the freeway. However, this ordinance proceeds to except from this general prohibition signs on buildings which would advertise the name of the person, firm or corporation occupying the premises or the type of business which is conducted by such person, firm or corporation unless the following shall occur:

"Section 5—Moving Parts, Flashing Lights Prohibited

No advertising structure, billboard or sign permitted by this ordinance shall contain moving parts, changing or flashing lights, including black light signs, changing colors or moving messages which attract attention to the sign which constitute or tend to constitute a hazard to the safe, efficient operation of vehicles upon the freeway or create a condition which endangers the safety of persons."

The administration of this ordinance is set up in the hands of three city executives: the Director of Planning, the City Engineer and the Superintendent of Building Inspection of the Department of Public Works. However, as a matter of expediency, all permits containing moving parts or flashing lights are referred to the Division of Traffic Engineering for review and recommendation as to whether such signs constitute a traffic hazard.

This matter has received a lot of study and many conferences have been held between advertising people and other traffic engineers. As a result, the administrative policy has been changed from time to time as more experience has been gained. In the initial application of this ordinance, the policy was tentatively adopted that no sign with moving parts would be permitted which could be seen from the

Fig. 3
Large moving sign—goblet filled with beer; name overlaid with "Beer Refreshing".

freeway by the motorist who would regularly be confronted with a choice decision due to traffic conditions. To establish these points, it was generally assumed that a distance in advance of the point of departure of the deceleration lane from the freeway of 1500 feet would constitute the restricted area. This distance was determined by the perception, judgment and reaction required by a motorist at the design speed of the freeway on approaching the point of decision necessary for the motorist to make up his mind on which decision to make. Within this area of perceiving, using his judgment and reacting to his decision, it was considered that the motorist should not have competition in the form of a sign with moving or flashing parts which might subconsciously distract him from his more important business of the moment—operating his vehicle. For the same reasons, in connection with the acceleration lane, a distance of 700 feet advance of the point of joining and 300 feet following the point of joining was considered a restricted area.

It was quickly pointed out, however, that this method of approach presented many inconsistencies and many factors which were difficult to evaluate. One of these inconsistencies and factors which was difficult to evaluate was the observation that some signs which were in motion and could be perceived certainly had very little attention value because the motion was relatively inconspicuous. Other locations presented complicated technical problems in determining prior to construction whether superelevation for example or the presence of a building would hide and obscure the sign from the restricted area, yet permit it to be seen from the "safe" area. As a result, it was decided that instead of prohibiting moving signs which could be seen from certain locations, it would be preferable to attempt to control the operation of the signs and permit them to be visible from all locations on the freeway so that the operation even at its most hazardous location would be of a reasonable type.

As a result, the policy was changed attempting to control only two conditions in the operation of a sign.

1. To prohibit excessive attention attracting value; and
2. To prohibit excessive retention value.

Fig. 4
Sign adjacent to free-way with sequence of moving blue background, rotating lamps spelling name and neon tubes spelling "Beer" from letters in name.

As a basis for this new policy, it has been assumed that the average motorist can resist a subconscious effort to have his attention distracted from the performance of any operation under some condition of speed of movement or change of light intensity. It is felt that under normal circumstances, anyone desiring to concentrate can certainly resist a man or woman walking in the vicinity and continue to concentrate on the subject at hand. In fact, it is felt that there is a point somewhat beyond the speed of a walking man or 4 feet per second at which at least 85% of the people can resist subconsciously the potential distraction which that movement presents. For this reason, a motion of 10 feet per second has been adopted as the limiting speed which should be presented by any advertising sign taken at a basic distance of 200 feet or less. The policy proceeds to state that as the sign becomes increasingly distant from the freeway this speed may be increased because its effectiveness on the motorist becomes less pronounced the more distant the sign is from the motorist. Similarly, the change of light intensity which cannot be rated in feet per second is adopted as a percentage of the total light intensity with increases permitted as the sign becomes more distant from the freeway. The premise on which this is based, is the fact that the effectiveness of the change of intensity is dependent primarily upon contrast and as a result once the sign is lighted the policy calls for continual light intensity of a minimum quantity which is based upon the percent of maximum intensity of the sign at any time.

In order to control the retention value of any sign which is believed to be just as hazardous as the initial attraction value, it has been concluded that the operation of a sign should be broken down into units of change and that each unit of change should have certain characteristics. In the first place, the unit of change should not be so fast as noted above that it should create a distracting attention value, nor should it be so slow that the motorist feels incumbent upon keeping his eyes on the sign in order to determine what the operation or the story of that unit of change will be. For this reason, there is both a maximum and minimum control placed upon the operation of the sign. In addition, a policy holds forth that there should be a waiting period between the two units of change so that if the motorist has reason to keep his eyes on the road beyond a mere confirmation glance he will not feel incumbent to return his eyes to the advertising sign before the unit of operation is completed.

By design, therefore, the message or story permitted by the ordinance should be told in separate units of change. Each unit of change should be completed rapidly enough so that the motorist can either see the completed unit with one glance (one second) at the sign or at least fast enough so that with one glance (one second) the motorist can anticipate a completed changed unit. On the other hand, the time between each unit of change should be slow enough so that the motorist should not subconsciously feel required to immediately return his eyes to the sign for fear that he will miss part of the message story or operation.

A policy of this nature, it is believed, will be a policy of regulation rather than one of prohibition. An attempt has been made to realistically arrive at certain limiting features which will preclude the more radical and more undesirable features of subconsciously forced distraction created by advertising signs from a standpoint of traffic safety and still permit motion of change in its milder form which the advertising industry feels is a necessary tool of their trade. This present policy has, in general, been discussed with several manufacturers of spectacular types of signs and while, in general, they are not in accord with the details of the policy, they are in general, in accord with its objects and aims. They readily admit that it is undesirable to have advertising signs which will compete with traffic safety demands because the large percentage of the motorists will be able to resist their signs. They have no desire to waste advertising or to contribute to a hazard. The ideal situation from their viewpoint would be to eliminate entirely, signs from those locations with which the motorist is so busy driving his car that he has little time to view advertising signs. However, inasmuch as in urban areas, it is virtually impossible to place a sign which can be seen only from that portion of the freeway at which motorists do not normally and regularly have a choice of decision, they are ready to conform to any reasonable policy which will permit that same sign to be viewed from a location of multiple choice by the motorist and still be within the realm of resistance.

In conclusion, therefore, these experiences, views and thoughts are presented to the Traffic Engineering profession in the hopes and expectation that other traffic engineers being confronted with the same problem, will feel a desire to exchange their views either by criticizing what is expressed in this article or presenting entirely new views of their own. The details and limiting features of the policy as now used in San Francisco are as follows:

POLICY ON REGULATION OF MOVEMENT AND LIGHT CHANGES OF SIGNS AND BILLBOARDS ADJACENT TO THE BAYSHORE FREEWAY

This policy has been developed for the purpose of uniform administration of Ordinance 8006 regulating signs and billboards adjacent to the Bayshore Freeway in San Francisco where such signs and billboards may be considered hazardous to motorists operating vehicles on the freeway.

The administrative committee considers that excessive attention attracting value and excessive attention holding value of any sign is hazardous to the motorist operating a vehicle on the freeway. A description and the effective limits of these two values are described as follows:

Wald Industries *Presents*..

WALD

REFLECTO • LINERS

FOR STRIPING HIGHWAYS, STREETS, AIRPORTS AND FOR INDUSTRY

Wald's lavishly illustrated 36 page catalog can be the handiest working tool in your office. Send for your free copy today.

Model 16

"Portable Double-Liner"

Compact and highly maneuverable, the *new* Wald Reflecto-Liner Model 16 is what you need for one-man striping in the thick of traffic. Handles ordinary non-reflective paints and highway reflective materials with equal ease. Single or double stripes, 2"-6" in width, can be laid with variable spacing as desired.

Model 16 employs a brand new drive principle assuring uniform-pressure drive on each of the two driving wheels. Air-activated, elbow, double-action traction is the newest in instantaneous positive drive mechanisms. Simple yet very effective. (Pat. applied for).

A constant air supply equal to 200% of the gun requirements is maintained without burdening compressor or motor. Such reserve—the heart of the striper—insures continuous and efficient performance allowing the use of many choice accessories listed below.

Designed with an eye to the *elimination of replacement parts*, this sturdy Reflecto-Liner is capable of long life and economical service.

Wald know-how has created the ideal machine for both single and double line duty—in or out of the heaviest traffic.

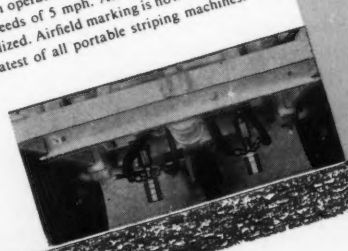
An unusual feature is the new foot brake in easy reach of the operator at all times. Braking pressure is equalized on the trailer wheels to control the striper at all times without the release of hands from operating position.

Here, at last, is a double-line, portable striper with adequate air supply. Incorporates all the easy cleaning aids for perfect marking. Buy the Model 16 and you buy the BEST.

Wald Engineers have considered operator comfort in the design of the Model 16. This Reflecto-Liner is built with a convenient, riding-trailer of sturdy construction fitted with cushion zero-pressure tires. The trailer may be quickly detached from the striper.

The new civilian and military markings for airfield runways and taxiways require lines as much as 3' to 12' in width. This has prompted the use of the Model 16 Reflecto-Liner for airfield markings, which with its two-gun operation will stripe a reflective line 12" wide at speeds of 5 mph. An outboard arm for the guns is utilized. Airfield marking is now a "snap" with this greatest of all portable striping machines.

- Application of one or two lines simultaneously.
- Light, balanced duty in or out of traffic.
- Two Nu-Matic Spray Guns with vertical and lateral adjustments.
- Patented, vertically-adjustable Wald Shroud for accurate line definition.
- All gauges and indicators in full view from operator's position.



This Reflecto-Liner is the "two-gun terror" of your striping problems. Wald's newest air cylinder, elbow traction gives positive drive. Air supply equal to 200% of gun requirements will handle needs of the two spray guns.

1956 PARADE of REFLECTO·LINERS

16 URES

- Speed variation by one simple adjustment.
- The most modern, efficient and economical double-line striper on the market today.
- Elbow, double-acting traction provides even driving pressure—positive-sure-and-quick—air activated. (Pat. applied for).
- Positive holding with Wald hand brake.
- Foot operated trailer brake on both wheels of the Model 16 trailer insures easy positive control of unit in operation.
- Large 15-gallon tank capacity.

...table, high-capacity unit.
...niversal hitch design for easy ...ment.
...n accessories for all types of ...k.
...types of marking materials from the ...ective paint to thin traffic paint.
...rics prevent material backup.
...t delivers 200% of the air required for ...n operation—a portable air plant for ...ss operation.

IFICATIONS

...6": Height—	
Traction:	Air-activated, double-acting elbow traction (Pat. applied for)
Brake, parking:	Positive locking, hand operated
Brake, deceleration:	Equalized foot control on riding trailer
Line Guides:	Wald vertically-adjustable Shrouds f... sharp line definition
Spray Gun:	2 high-capacity, Nu-Matic guns, controlled to produce uniform cr... distribution; 4.6 cfm
Gun Cleaner:	1 Qt. Air-Operated
Controls:	Quick-As-A-Wink Valves
Fittings:	Standard Pipe Thread
Speed:	3-5 mph variable speed mechan...
Pointer:	40" Telescopic
Riding Trailer:	Zero-Pressure cushion tires
Regulators:	Bellows Type with lock featu...
Air-Gun Ratio:	1 gun—4:1, 2 guns—2:1
...and Tubular Anti-	
...Zero-Pressure tire ...tional)	
...—Pneumatic tires	
...earings	
...ide Mouth 5¼"	
...el (optional)	
...rpm—Air Cooled	
...00 psi—50% Air Reserve	

CCESSORIES

...dition to the standard options on specified items, the following acces-...s are available to increase the use of your Model 16 Reflecto-Liner:

...ort Trailer
...ner
...ulin
...et
...ffs
...board (One

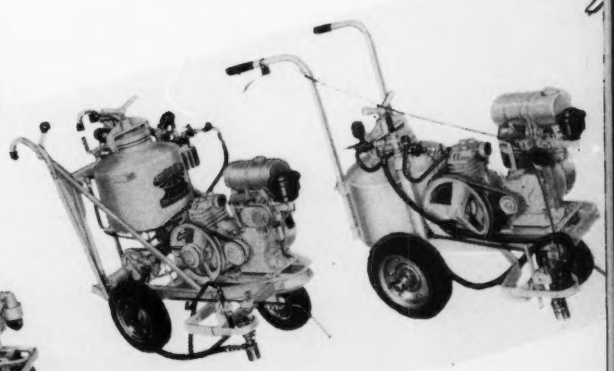
Outboard Striping Arm for Airfield Operation (Two gun)
Sphereoliner Glass-Sphere Dispensers
Service Parts Kit
Power Tool Kit
Dusting Gun, Sand Blast Gun, Air Hammer, and Tire Inflator

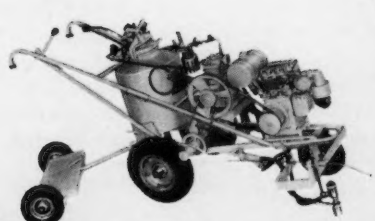
Here's a preview of the latest and greatest in highway striping equipment.

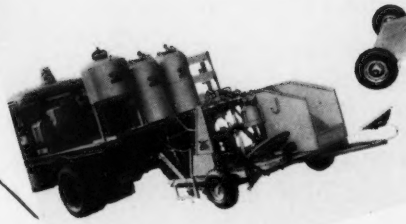
Again Wald outdistances the field! Many new items, many new designs and improvements over previous models—all are ready for your inspection and study in the practical, new reflecto-liner catalog. They are ready also to give you the same dependable, efficient and economical performance that has characterized Reflecto-Liner leadership in the striping field in years past. These new machines are the result of constant research and study by engineers, technicians and other qualified specialists, into the many marking problems that confront the traffic engineer. There is a Wald Reflecto-Liner to meet every requirement, every budget. Find out for yourself how the Reflecto-Liner fitted to *your* needs can increase production and decrease cost on your striping program.

Write for the new Wald Catalog W-56—Now!

WALD INDUSTRIES, Inc.
HUNTINGDON, PENNA.







Excessive Attracting Value

Any sudden change in motion, color or light intensity which subconsciously forces or attracts the eyes of the motorists to the sign when it is essential due to traffic conditions that they be watching the freeway is considered to be excessive attracting value. As a measure of changing conditions to which the average person is accustomed and can resist without undue effort it is considered that any change faster than two and one-half times the speed of a walking man or 10 feet per second is potentially hazardous. Likewise the restrictions on changes of light intensity adopted in this policy are for the purpose of controlling the same physiological effect of excessive attention value.

Excessive Retention Value

Retention value of the sign should not be such as to subconsciously require constant viewing (more than a glance or one second at a time) in order that the motorist be satisfied that he will get the message or story being told by the sign.

By design therefore, the message or story permitted by the ordinance should be told in separate units of change. Each unit of change should be completed rapidly enough so that the motorist can either see the completed unit with one glance (one second) at the sign or at least fast enough so that with the one glance (one second) the motorist can anticipate the completed change unit. On the other hand, the time between each unit of change should be slow enough so that the motorist should not subconsciously feel required to immediately return his eyes to the sign for fear that he will miss part of message, story or operation.

Intent of Policy Paramount

The restrictions outlined below are intended to obtain the physiological effect on motorists just described. Any operation not completely covered or controlled by the restrictions noted will not be approved if the operations can be construed as defeating the intent of this policy. In addition other hazardous operations such as signs immediately adjacent to the freeway with intensity of light so great as to produce glare and other hazards will be treated individually.

Definitions

Motion is any movement created by mechanical or electrical means whereby an apparent action by a figure or object is effected or whereby a color change by curtain effect or progressive light changes of the same color and/or intensity produces an apparent motion to the viewer. Motion shall be rated in feet per second.

Change of intensity is any other operating feature of a sign which cannot be classed or rated as a motion. Change of intensity shall be rated as a percent of the total intensity per second based upon the maximum intensity of the background area.

Background area is that portion of the sign in which at least 50% of the light units to be used as a base for computing change of intensity are in close proximity of the changing units and appear to be part of the immediate area.

Unit of change is one continuous operation in one single objective direction and may be one of a series of unit changes. For example, a curtain down and then up would be two change units; a man walking and then returning would be two change units; a man raising arm and drinking —then lowering arm—would be two units.

Flashing lights are those parts of the sign which come on as a unit from a background of total blackness or approaching total blackness and which by design cannot conform to the restrictions relative to *change of intensities* or time limit of units of change.

1. *Limit of Lowest Brightness*

No complete blackout of words, messages, symbols, figures, etc. shall occur during operation of the sign. Signs of 70 feet in height or less shall at all times of lowest brightness be not less than the following percentages of the maximum total brightness as determined proportionately by the minimum visible distance from the freeway:

Distance	*Lowest Brightness*
100 - 200 ft.	80% - 50% of maximum
200 - 400 ft.	50% - 35% " "
400 - 1000 ft.	35% - 25% " "
1000 - 2000 ft.	25% - 15% " "
2000 - 5000 ft.	15% - 0% " "

2. *Time Limit of Units of Change*

Any unit of change shall be completed in not less than one (1) second nor more than three (3) seconds and shall remain in steady operation without change for at least an additional period of two (2) seconds before proceeding to the next unit of change. More than one unit of change can take place simultaneously but shall not overlap in time the operation of any other change unit.

3. *Rate of Change*

The maximum rate of change shall be:

(a) For motion, including ripple or similar effects, 10 feet per second.

(b) For change of intensity, including scintillating changing colors or similar effects, shall be 10 percent of maximum intensity per second.

For minimum visible distances between the sign and the freeway (a) and (b) above may be increased in proportion to the distance within the limits shown as follows:

Distance	*Motion*	*Intensity Change*
200 - 1000 ft.	10.0 - 17.5 ft./sec.	10.0 - 17.5% of max.
1000 - 1500 ft.	17.5 - 25.0 ft./sec.	17.5 - 25.0% " "
1500 - 2000 ft.	25.0 - 50.0 ft./sec.	25.0 - 50.0% " "
2000 - 5000 ft.	50.0 ft./sec.	50.0 - 100.0% " "

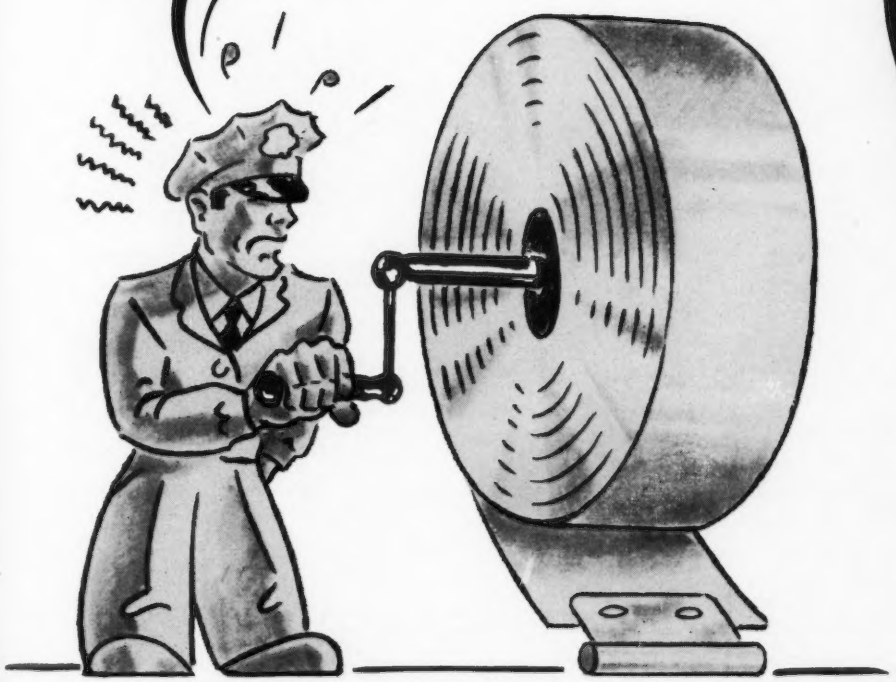
4. *Continuous Motion*

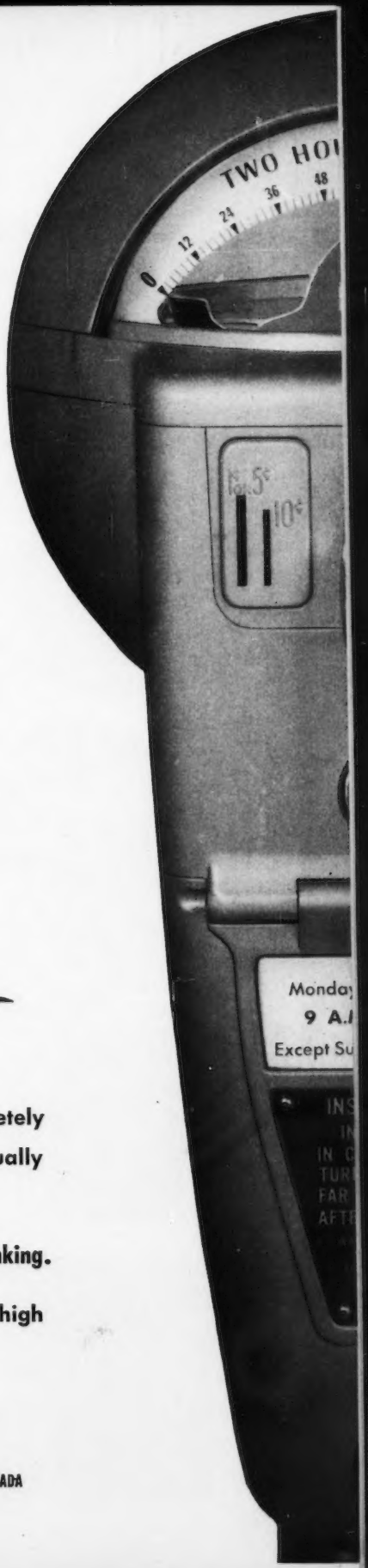
A motion without change of direction (i.e. outline of letters in a name) or without change of operation (i.e. continuous ripple or scintillating effect) will be permitted without affecting time limit of unit changes providing the operation is smooth and regular and conforms to Rate of Change in (3) above.

5. *Flashing Lights*

No flashing lights will be permitted on any sign which is legible from the freeway. Flashing lights on signs which are visible but are not legible from the freeway shall be permitted only if the flashing lights are shielded so as to be obscured from the freeway.

SAVE THAT WINDING EXPENSE!





The **DUNCAN-MILLER®** *"60"* **Completely eliminates this costly, troublesome, energizing action usually required twice, three times or more often each week.**

Hundreds of cities are banking . . . What others spend for cranking.

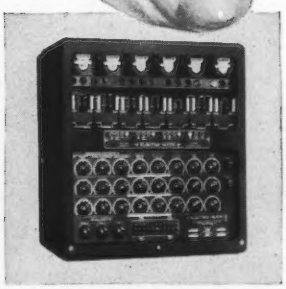
Trade now for the world's finest meter and enjoy a new high in economy of operation and maintenance.

•

DUNCAN PARKING METER CORP.

835 N. WOOD ST., CHICAGO 22, ILL. — FACTORIES: HARRISON, ARK. & MONTREAL, P. Q., CANADA

Manufacturers of fully automatic and manual parking meters.



the Traffic Engineer uses controllers that think for his staff...

Of course we can't add engineers to your staff, but our Electro-Matic® Traffic-Actuated Controls can do a lot of thinking for you at your intersections. Electro-Matic® will move maximum traffic volumes with minimum delay under all conditions. A complete line of traffic-actuated controls is available for every type of intersection. Our trained specialists can assist you in the solution of your signaling problems.

"There is no substitute for Automatic's experience."

For complete details, write for free bulletin.

AUTOMATIC SIGNAL
DIVISION

EASTERN INDUSTRIES, INC.
NORWALK • CONNECTICUT

(Continued from page 64)

TABLE I

Summary of Reported Crowning Techniques

	Crown Type			
	Narrow Median		*Wide Median*	
State or Authority	*One-Way*	*Two-Way*	*One-Way*	*Two-Way*
1. Arizona	x	—	—	x
2. Arkansas	x	—	x	—
3. California	x	—	x	—
4. Colorado	x	—	x	—
5. Connecticut	—	x	—	x (1)
6. Florida	x	—	—	x
7. Georgia	x	—	x	—
8. Illinois	x	—	—	x
9. Iowa	x	—	—	x
10. Maryland	x	—	—	x (2)
11. Massachusetts	—	x	—	x (3)
12. Michigan	see note (4)		—	x
13. Minnesota	no reply to inquiry			
14. Missouri	x	—	—	x
15. New Jersey	x	—	—	x
16. New Mexico	x	—	—	x
17. New York	x	—	—	x (3)
18. North Carolina	x	—	x (5)	x (5)
19. Oregon	x	—	—	x
20. Pennsylvania	x	—	x	—
21. South Carolina	no reply to inquiry			
22. Utah	x	—	x	—
23. Virginia	x	—	—	x
24. Washington	x	—	x (6)	x (6)
25. Colorado Turnpike	x	—	—	x
26. Florida Turnpike	x	—	x	—
27. Garden State Parkway	—	x	x	—
28. Indiana Turnpike	x	—	—	x
29. Ohio Turnpike	x	—	—	x
30. Penna. Turnpike	x	—	x	—
31. New Jersey Turnpike	—	x	—	x
32. New York Thruway	—	x	—	x (3)
	—	—	—	—
	24	5	11	21

(1) 3rd lane added in median; crown between two outside lanes.
(2) 3rd lane added in median; crown in center of middle lane.
(3) 3rd lane added in median; crown between two inside lanes.
(4) Reported current practice excludes narrow median design.
(5) One-way crown up to 30′ median; two-way crown median over 30′.
(6) One-way crown up to 40′ median; two-way crown median over 40′.

Other agencies contacted for data:
Bureau of Public Roads, Institute of Traffic and Transportation Engineering, Chevrolet, Dodge, Plymouth, DeSoto, Chrysler, Cadillac (no reply), local car dealers, garages, alignment stations.

Therefore, there would appear to be a certain amount of time saving, both in the office design and field construction, to the one-way crown over the two-way crown. Agencies which are continually looking for ways to streamline production methods and cut field costs could do well to further investigate this subject in view of the foregoing.

Conclusion

Despite the number of states favoring the use of a two-way crown on highways having wide medial strips, the one-way crown would seem to have a definite advantage. Most important, in comfort and ridability, it gives the motorist the type of ride for which the car is designed. With drainage facilities, particularly in regions of moderate rainfall, there is a certain economy and advantage to placing water in side ditches more promptly. And in the design and construction stages, there is a saving in time and costs of importance to the budget. In addition, because many states reported that with an adequately depressed median, there was no problem due to melting snow running across pavements, the objection to a one-way crown seems limited primarily to rainfall run-off. And even this point, in the absence of actual studies on the subject, must be further explored before an adequate conclusion can be reached.

SALES REPRESENTATIVE WANTED
TRAFFIC SIGNAL EQUIPMENT

FOR DENSELY POPULATED TERRITORY INCLUDING LARGE CITIES

— QUALIFICATIONS —

SOME TRAFFIC ENGINEERING EXPERIENCE
ELECTRICAL OR MECHANICAL ENGINEERING
COMPANY WILL PROVIDE SUPPLEMENTARY TRAINING

— EXCEPTIONAL OPPORTUNITY —

WRITE SUMMARY OF TRAINING AND EXPERIENCE TO
PERSONNEL MANAGER
EAGLE SIGNAL CORP.
202 20th STREET MOLINE, ILL.

Indeed, the origin of the two-way crown on the divided highway appears to be, as some states admitted, the carry-over from building the two-lane highway without really giving much thought to the characteristics resulting from two-way crowns on one-way travel.

And, if we as highway engineers are to strive to continually improve our nation's roads, carry-over engineering must be discarded and new ideas constantly introduced.

Have YOU!! (Yes, we mean you)

Submitted your traffic photographs yet?

(See July issue for original announcement)

FIRST PRIZE — $25 U. S. SAVINGS BOND

Contest ends December 31, 1955

Mail entries to M. M. TODD

211 Strathcona Hall, New Haven 11, Conn.

TRAFFIC NEWS

J. Al Head Receives Hewes Award

J. Al Head

J. Al Head (Mem., ITE), Assistant Traffic Engineer, Oregon Highway Department, was presented with the L. I. Hewes Award on September 10 at the annual meeting of the Western Association of State Highway Officials at Jackson Lake Lodge, Wyoming. This award consisting of a plaque and $500 in cash in memory of the late Dr. Lawrence Illsley Hewes, long time Deputy Chief Engineer in the San Francisco office of U. S. Bureau of Public Roads, is given annually to a young highway department employee who has made an unusual contribution in a field of highway promotion and development. Mr. Head received the award for the clear-cut, readily-understood, forcible, analysis he presented in the Highway Department's report, "Plan for Freeways and Expressways in the Portland Metropolitan Area."

Head is a native of Oregon, having gone to High School in Eugene and Portland. After three years at Oregon State College from 1932 to 1935 he accepted employment with the Oregon State Highway Department and rose through the ranks to reach his present position in 1943. He took a leave of absence for his final year at Oregon State from which he received a degree in civil engineering in 1939.

He has been Vice-President and President of the Western Section of the Institute of Traffic Engineers, and is also active in the American Society of Civil Engineers and American Road Builders Association.

Conference Held on California Vehicle Code

On August 31, 1955, the Greater Los Angeles Chapter of the National Safety Council sponsored the third in a series of traffic engineering conferences designed to acquaint representatives of the cities in the Greater Los Angeles area with current traffic engineering problems. The subject of the recent conference was the changes in the California Vehicle Code brought about by the 1955 meeting of the State Legislature. Emphasis was placed on those changes which primarily concerned the movement of traffic and related traffic engineering matters. There were 199 changes in the Vehicle Code which affected traffic regulations or the movement of traffic. Four of these changes were discussed in detail and many others reviewed and briefly analyzed by the legal counsel of the Automobile Club of Southern California.

In his opening remarks, Mr. J. T. Blalock, President of the Greater Los Angeles Chapter, National Safety Council, stated that his organization felt that one of the most valuable functions which it could perform in its continuing efforts towards accident prevention was the bringing together of representatives of the various governmental and private organizations in the area to achieve a common objective and uniformity in the administration of traffic control.

Members of the Institute of Traffic Engineers who took part in the discussion under the chairmanship of Mr. Joseph E. Havenner were: Mr. A. L. Hutchison, Assistant District Engineer, California Division of Highways; Mr. Guy D. McDonald, Traffic Engineer, County of Los Angeles; and Mr. Lloyd M. Braff, General Manager, Department of Traffic, City of Los Angeles.

Mr. Hutchison discussed changes in the speed limit regulations which now permit local authorities to establish such regulations in five miles per hour increments between 25 miles per hour and 55 miles per hour. Previously, the establishment of such regulations was permitted only in ten miles per hour increments. The amendment to the Vehicle Code gives additional flexibility and permits the establishment of speed limit regulations more closely conforming to speeds which are reasonable and safe for the prevailing conditions.

Mr. McDonald discussed the change in the Vehicle Code requiring crosswalks and advance warning markings adjacent thereto which are placed contiguous to school locations, to be painted yellow. Some communities in the State of California had previously used yellow

(Continued on page 93)

W. A. Rusch Named Staff Director

W. A. Rusch, Assistant to the City Manager of Kansas City, Missouri, has been appointed Staff Director for the National Committee on Urban Transportation, effective October 1, according to Committee Chairman Glenn C. Richards, Commissioner of Public Works of Detroit. The office of Staff Director will be located in Washington, D. C.

Mr. Rusch is 37 and a native of Wisconsin. He received a B.S. Degree in Landscape Design from the University of Wisconsin and a M.S. in Town and Regional Planning from Iowa State College in 1949.

For three years Mr. Rusch was a Senior Draftsman with the Planning Division of the Chicago Park District. In 1950 he was appointed Associate Planner with the Kansas City (Mo.) City Plan Commission and two years later was promoted to Senior Planner. He became administrative assistant to City Manager L. P. Cookingham in August, 1953. Mr. Rusch had considerable experience during the past five years in planning for the transportation needs of Kansas City.

During World War II, Mr. Rusch served in the Corps of Engineers and attained the rank of Captain as Post Utilities Officer and construction engineer for the U. S. Air Force Headquarters on Guam.

As Staff Director of the National Committee on Urban Transportation, Mr. Rusch succeeds Norman Kennedy who served the National Committee for one year while on leave from the Institute of Transportation and Traffic Engineering of the University of California.

Indiana-Michigan-Ohio Tri-State Meeting

On Friday, September 23rd, City Traffic Engineer *Paul S. Robinette* of Toledo and the Michigan Section sponsored a joint meeting of about 85 Indiana, Ohio and Michigan section members. The meeting was held in the Ohio Edison Company Employees Club House.

The meeting place was an old power station on the Maumee River that has been converted into a large, well appointed club house. Entrance is made through about a 12-foot diameter boiler tube tunnel about 200 feet in length with about an 8 percent grade. Going in is easy — downgrade — coming out you wonder why the moving belt people don't get busy on this prospect.

Lake Erie Pike caught especially for the occasion by the Toledo fishing fleet and a few fried chickens caught by *Robinette's* staff, were the main articles of nourishment on a good menu that stopped the hunger pangs whetted by the vendors' pre-dinner contributions.

For traffic engineers it was a very gentlemanly assemblage as President *Gervais* and Program Chairman *Levine* had no difficulty getting the group into the auditorium for the discussion on how to turn common ordinary engineers into the elite corps of traffic engineers.

Bill Knight, Executive Assistant Director of Traffic Safety, State of Ohio, threw out a few well chosen words to the group pointing out that technical advice and information concerning traffic problems is available for traffic engineers. However, he pointed out that with so relatively few traffic engineers in Ohio it is difficult to get uniformity in traffic control. When the responsibility of traffic control is definitely set up there is always marked improvement in traffic conditions.

Jim White, Associate Member of ITE, Design Engineer, Indiana State Highway Commission, presented a short paper outlining the procedure necessary to get Indiana State Legislature to pass legislation requiring that traffic engineers in cities over 100,000 population be registered professional engineers. This was done not too long ago and while it is not required for cities from 50,000 to 100,000 it is definitely encouraged. He predicted that eventually it would be mandatory that all traffic engineers heading departments in Indiana be registered professional engineers.

While not on the official program two highly respected members of ITE—*J. Carl McMonagle,* Director of Planning & Traffic, Michigan State Highway Department and a Vice-President of National Safety Council, and *Al Malo,* Director, Department of Streets and Traffic, Detroit, also one of the ITE national directors, made brief remarks.

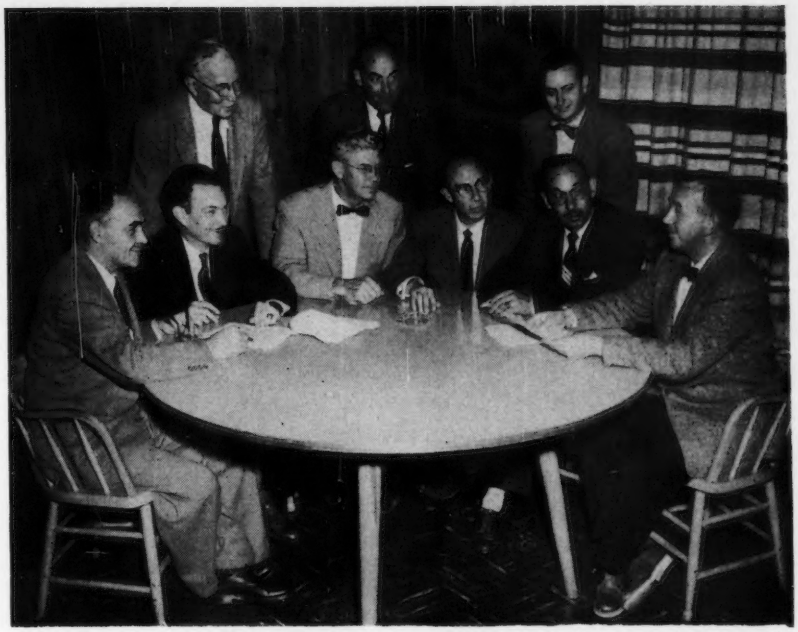


Photo by Toledo City Journal

NATIONAL AND SECTION OFFICERS AT INDIANA-MICHIGAN-OHIO TRI-STATE MEETING AT TOLEDO, OHIO, SEPTEMBER 23, 1955

Left to right, seated—Harold G. Eckhardt, President, Ohio Section, Columbus, Ohio; J. A. Carrothers, Secretary, Ohio Section, Dayton, Ohio; James B. Neff, President, Indiana Section, Indianapolis, Ind.; J. Carl McMonagle, ITE Vice-President, Lansing, Mich.; A. F. Malo, Director, District No. 3, Detroit, Mich.; Edward F. Gervais, President, Michigan Section, Lansing, Mich.
Standing—Paul S. Robinette, Host to Tri-State Meeting, Toledo, Ohio; Allen T. Hayes, Secretary, Michigan Section, Lansing, Mich.; Donald W. Barry, Secretary, Indiana Section, Ft. Wayne, Ind.

President *Gervais* introduced Dr. *Ray Snell,* head of the Civil Engineering Department of Michigan State University, and Professor *John Kohl,* Director of the Highway Transportation Institute of the University of Michigan. These two engineering educators discussed thoroughly the problems connected with setting up specialized courses in the engineering field. Some of the difficulties arise from inability to sell university administrative officials on the need for specialized training in traffic engineering. This stems from the fact that the student demand for TE training is negligible because of the lack of proper promotion and upgrading of traffic engineering positions in various agencies.

It was pointed out that more and more universities are demanding that professors have Ph.D. degrees. If one aspired to teach TE and a Ph.D. is required, men properly trained in traffic would not possess and would probably be unable to get a degree in TE. Men in the field have filled gaps in educational institutions. Men should be trained in the profession of TE and the routine jobs of non-engineering requirements should be done by others. Ohio has worked out a system of in-service training which puts young engineers in responsible positions and does not discourage them with routine traffic studies and surveys.

The present training for engineers in universities and colleges provides little or no traffic courses and for men who desire to pursue a traffic engineering training program, there are no established curricula. It was the consensus of opinion that selected courses should be provided in undergraduate work so that the basic fundamentals required in traffic engineering training would be obtained.

Several members expressed the opinion that there should be an opportunity to register as a TE. In Ohio you may register in many classifications—except TE.

This discussion showed up existing shortcomings in the educational field and recognition of traffic engineers as an important and growing branch of engineering.

Our thanks to Paul Robinette for hosting this informative meeting.

New Appointments . . .

Borrowman Moves To Ottawa

Ralph W. Borrowman (Mem., ITE) has recently accepted appointment as Engineer in Charge of Planning for the City of Ottawa, Ontario. This is a new position, created to further the planning

Ralph W. Borrowman

of Canada's National Capital. Mr. Borrowman's duties will include general direction of the planning staff, and preparation of a Master Plan for the City of Ottawa proper, in accord with the overall planning for the larger Capital Region.

Mr. Borrowman, who was born and educated in Winnipeg, Manitoba, attended the University of Manitoba, graduating in 1940 with the degree of Bachelor of Science in Civil Engineering. In 1954, he enrolled again at Manitoba, in the School of Graduate Studies preparing for his Master's Degree in Community Planning.

From 1945 until his present appointment Mr. Borrowman was associated with the Metropolitan Planning Commission of Greater Winnipeg, as Associate Planner. During this period, he was engaged first in the preparation of a master plan, and later in general city planning with particular reference to subdivision design, zoning, traffic and parking.

In addition to his membership in the Institute of Traffic Engineers, he is a Registered Professional Engineer in the Province of Ontario, and is a member of the Engineering Institute of Canada, the Town Planning Institute of Canada, and other professional organizations. Away from the office, he has been active

(Continued on page 91)

Illinois Engages John E. Baerwald

John E. Baerwald (Assoc. Mem., ITE), former Research Engineer on the staff of the Joint Highway Research Project, Purdue University, has accepted appointment as Assistant Professor of

John E. Baerwald

Traffic Engineering at the University of Illinois. He will be in charge of developing a teaching and research program in Traffic Engineering. He will also be Faculty Advisor of the student chapter of ITE and in charge of the Annual University of Illinois Traffic Conference.

A native of Milwaukee, Wisconsin, where he received his early schooling, Baerwald attended Valparaiso University, Valparaiso, Indiana, for two years and then transferred to Purdue where he received a BSCE in 1949. As a half-time staff member he remained at Purdue and was granted the MSCE degree in 1950.

As full-time Purdue staff member since 1950, he was in charge of the traffic engineering section and completed all the requirements for the Ph.D. degree. He also originated and was responsible for the Annual Purdue Traffic Control Conferences.

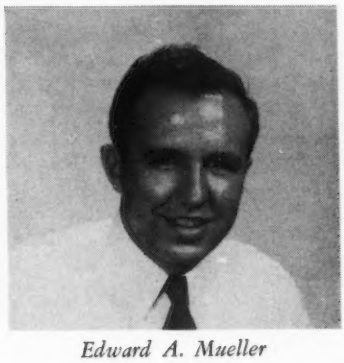
Mr. Baerwald's schooling at Valparaiso was interrupted by military service. In the army he served as an enlisted man and commissioned officer in the states and overseas.

The author of numerous technical papers, Mr. Baerwald received the Past President's Award of the ITE in 1953. He has been active in national ITE affairs having served on various committees and last year was Secretary-Treas-

(Continued on page 91)

Mueller Joins Florida Department

The appointment of Edward A. Mueller (Jun. Mem., ITE) as Assistant Engineer of Traffic with the Florida State Road Department's Traffic and Planning Division was announced September 1st.



Edward A. Mueller

Before moving to Tallahassee, Florida, Mueller was a Research Assistant at the Yale Bureau of Highway Traffic for over two years.

He is a native of Madison, Wisconsin, and attended the University of Wisconsin for a year and a half before entering the Navy in 1943. Service duties included Boot Camp, participation in the V-12 college program at Notre Dame, and a period of duty as an Ensign with the Civil Engineer Corps in 1945 and 46, both in the United States and Philippine Isles. He returned to Notre Dame after service and received his degree in Civil Engineering in 1947.

Mr. Mueller spent the next three years with a consulting firm in Madison, Wisconsin, being largely concerned with rural electrification, location and supervision of construction. In 1950 he was employed by the firm of Ammann & Whitney who were developing an Expressway system for Milwaukee. Ed became interested in traffic while working on geometric design and planning and took the Yale Bureau of Highway Traffic graduate training in traffic engineering in 1952. Ed was retained by the Bureau as a member of its faculty after graduation in 1953.

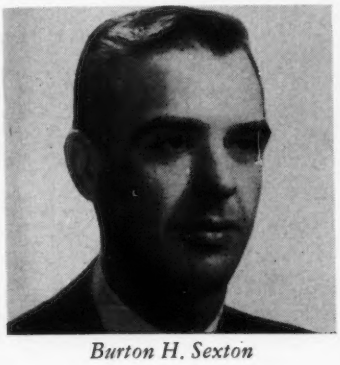
His activities in Florida will be largely concerned with geometric and traffic planning of various urban expressway programs. His professional activi-

(Continued on page 91)

New Appointments . . .

Sexton Becomes Consultant

Burton H. Sexton (Mem., ITE), former Senior traffic engineer for the Capital Transit Company of Washington, D. C., resigned in September to open his own offices at 4540 MacArthur Boulevard in Washington as a Traffic and Transportation Consultant.



Burton H. Sexton

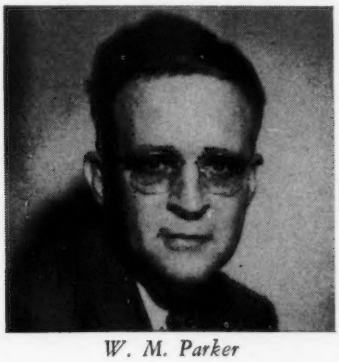
He joined Capital Transit in 1951 coming here from the Indianapolis Railways, Inc. He served as a pilot in the USAF and as Motor Transport Officer from 1943 to 1945. He graduated from Purdue University in 1949, and received a certificate from the Yale Bureau in 1950.

Sexton has been engaged in private consulting during his tenure with Capital Transit in traffic and transportation particularly in certain aspects of zoning, traffic control and operations, geometric design of parking and terminal facilities and roadway facilities. He has been a qualified witness before such bodies as the U. S. District Court, D. C. Zoning Commission, Board of Zoning Adjustment, Zoning Board of Appeals Montgomery County and the Winchester Circuit Court of Virginia.

He is President of the Washington Chapter Institute of Traffic Engineers, a member of the Washington Society of Engineers, the Highway Research Board and has presented papers before the National Safety Council, American Transit Association and Harvard University. Sexton is a member of the Commissioners Traffic Advisory Board and past member of the Board of Directors of the D. C. Trucking Association and the Junior Chamber of Commerce.

Parker Appointed Traffic Engineer

In July 1955, W. M. Parker (Mem., ITE) reported as Traffic Planning Engineer for the City of Macon - Bibb County Planning and Zoning Commission. Previous to this appointment, Parker had worked about two years as Highway Planning Engineer for the Georgia State Highway Department on a Comprehensive Macon and Bibb County Traffic Survey. He has settled down in his new position and has begun work toward what he hopes will be an eventual answer to the growing pains of urban traffic in the Macon area.



W. M. Parker

He spent his youth in Washington, D. C., and enrolled in the University of Maryland, taking the C. E. course. After leaving the University, the next twenty years carried him to forty different states in construction, valuation and maintenance work with various railroad companies. Thirteen of these years were spent in Florida with the Florida East Coast Railway.

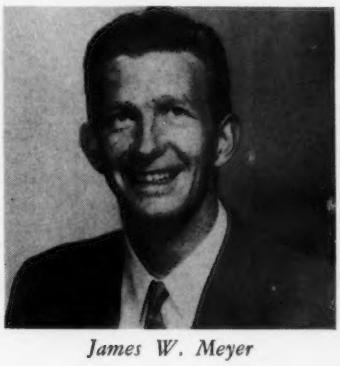
In 1936 he transferred his activities to the State Road Department in Florida, where at Tallahassee he organized the Division of Highway Planning, later changed to the Traffic and Planning Division. The Division made thirty-five separate studies of urban traffic problems, including the larger cities of Jacksonville, Miami and Tampa. He set up a permanent system of highway sections for the State System, approximately 10,000 miles. Construction and maintenance costs are reported under each of the some 2,000 permanent sections and the system has become a valuable aid to administrative and engineering officials.

In January 1952, having reached the retirement age in Florida, Parker joined the Georgia Highway Department to assist in studies involving locations for certain sections of the proposed Atlanta Expressway System. He began the highway and street improvement program in

(Continued on page 91)

Meyer Accepts New Position

James W. Meyer (Assoc. Mem., ITE) has been appointed Traffic Engineering Consultant to the Indonesian Government, under the terms of a contract with the J. G. White Engineering Corporation of New York. The program is sponsored by the International Cooperation Administration. The work will involve the development of a comprehensive plan for adequate traffic control facilities in Djakarta, Indonesia's capital city, population nearly three million.



James W. Meyer

A native of the San Francisco Bay Area, James Meyer has resided in Berkeley since his discharge from the Army Air Forces in 1945. He is a graduate of the University of California, and was employed by the Institute of Transportation and Traffic Engineering in 1949-1950 while he was engaged in research projects under the direction of Don Berry and Norman Kennedy.

For the past four years, he has served as the Traffic Engineer of Berkeley, California, and is now taking a leave of absence while in Indonesia.

His wife, Barbara, and three-year-old son, Roger, are expected to join him soon. His address is c/o The United States Embassy, Djakarta, Indonesia.

The first picture of the 1955-56 Board of Direction. Left to right: George J. Fisher, Director, District 4; Edward G. Wetzel, Director, District 1; Vice-President Joseph E. Havenner, Technical Division; President Charles W. Prisk; Gordon K. Gravelle, Director, District 2; Vice-President J. Carl McMonagle, Administrative Division; Immediate Past President Harry Porter, Jr.; Alger F. Malo, Director, District 3; Karl A. Bevins, Director, District 5; and Matthew C. Sielski, Secretary-Treasurer. Newly appointed Director Herbert C. Higgins of District 6 was unable to be present.

Pittsburgh Meeting Largest Ever

More than 540 ITE members, wives and guests met in Pittsburgh in late October for the Founder's 25th Birthday Meeting to enjoy a well-planned, instructive and entertaining program which had been arranged by the Local Annual Meeting Committee under the able direction of General Chairman Michael J. Gittens, Traffic Engineer of Pittsburgh. The Business Meeting, splendid Technical Sessions papers, special scheduled events and delightful ladies' program were highlights of the Conference which began October 23 and ended October 27. The William Penn Hotel, headquarters of the Founder's 25th Birthday Meeting, was also the site of the initial organizational meeting at which the Institute was founded, October 2, 1930.

Work Conference

A two-day work conference attended by more than 40 prominent Traffic Engineers immediately preceded the opening of the general Annual Meeting. This special conference had been called by the Policy Committee, composed of Past Presidents of the Institute, under the Chairmanship of Donald M. McNeil for the purpose of exploring the developments to be expected in the highway transportation field, and the role the traffic engineering profession will play during the next 25 years. The agenda for general discussion included subjects such as the growth of highway travel, trends in the size and weight of vehicles, mass transit, shopping centers, zoning, long range planning, and many other related subjects. During the latter part of the conference the group divided into Committees to pursue the more important subjects in greater detail. A summary of the work conference was made available to those who attended the Annual Meeting and a complete report is in preparation.

Annual Business Meeting

The most important business of the Annual Meeting for members was election of the Institute Officers. Charles W. Prisk, Supervising Highway Transport Research Engineer, Bureau of Public Roads, Washington, D. C., was elected President. J. Carl McMonagle, Director, Planning and Traffic Division, Michigan State Highway Department, Lansing, and Joseph E. Havenner, Manager, Public Safety Department, Automobile Club of Southern California, Los Angeles, were elected Vice-Presidents, while Matthew C. Sielski, Director, Safety and Traffic Engineering Department, Chicago Motor Club, will serve as Secretary-Treasurer. Others elected were George J. Fisher, Director of Service, 205 City Building, Wichita, Kansas, elected Director, District 4; Gordon K. Gravelle, Transportation Engineer, Automotive Safety Foundation, Washington, D. C., elected Director, District 2; and Edward G. Wetzel, Assistant Chief, Planning Division, Port of New York Authority, re-elected Director, District 1. All Directors will serve two-year terms. Incumbent members of the Board elected to two-year terms last year are Karl A. Bevins, Atlanta, Georgia, Director, District 5; and Alger F. Malo, Detroit, Michigan, Director, District 3. The Board met after the Business Meeting to fill the Director's post, made vacant by election of Mr. Havenner to Vice-President, and unanimously endorsed the appointment of Herbert C. Higgins, Office Engineer, Department of Highways, Olympia, Washington, as Director, District 6.

The reports of the President, Secretary-Treasurer and Executive Secretary all stressed the satisfying growth of the Institute and forecast the important role the organization continues to play in the field of highway transportation.

Technical Sessions

Morning and afternoon Technical Sessions were held both Tuesday and Wednesday. Several excellent papers were presented at each Session and were well received by a large and attentive audience numbering at times more than 300 people.

Tuesday morning Technical Sessions papers pertained to subjects in fields allied with traffic engineering. Past President Donald M. McNeil of Pittsburgh, presided. Mr. Alfred E. Johnson, Executive Secretary, AASHO, delivered a paper, "Where Are We Going In Our National Highway Program?" Mr. Johnson stressed the need for further development of the Interstate Highway System. Although this System comprises only 1¼ percent of all public roads in the United States, it serves all cities of 50,000 and more population, joins 42 of our state capitols and carries 14 percent of all traffic. He estimated that only 8 percent of the interstate highways meet the minimum geometric design standards established for the Interstate System.

PHOTO No. 1
Harry Porter, Jr. (left) marks the end of his successful administration by passing the gavel to newly elected President Charles W. Prisk.

PHOTO No. 2
Mr. John W. Darr of the ACF Industries, New York City, speaks on public relations at the first Technical Session. Seated left to right: Presiding Chairman Donald M. McNeil of Pittsburgh; Alfred E. Johnson, Executive Secretary, AASHO, Washington; and Kenneth A. Stonex, Technical Data Director, General Motors Proving Ground, Detroit.

PHOTO No. 3
Michael J. Gittens, General Chairman of the Annual Meeting Arrangements Committee, opens the Kick-Off Luncheon with welcome to ITE members, wives and guests. Seated lett to r.gnt: Mrs. Charles W. Prisk, President-Elect Charles W. Prisk, and President Harry Porter, Jr.

PHOTO No. 4
Ed Ricker unaware of "losing" his watch and billfold at the hilarious Biscuit Banter Breakfast.

PHOTO No. 5
Joe Feuchter being assisted in the removal of his vest without the necessity of taking off his coat at the Biscuit Banter Breakfast.

PHOTO No. 6
Charles M. Upham, Jr., of Baltimore, substituting as official Convention photographer for "Traffic Engineering" in the absence of regular photographer Hank Barnes, tries out Joe Prismo's grand prize awarded F. Bruce Crandall, who was selected by lot from the 24 ITE Steel City Casino party winners. Mr. Crandall was reported to be planning to drive this scaled down electrically powered Ford Thunderbird back to Oregon.

The second address of the first Session was made by Mr. John W. Darr, Director of Public Relations, ACF Industries, New York City, who spoke on "Public Relations for the Traffic Engineer." Mr. Darr's major point was that public opinion is the target of public relations and that there can be no "cut and dried" answers. In his estimation public opinion is a prerequisite for the solution of our highway problems. The final paper of the first Session, presented by Mr. Kenneth A. Stonex, Head, Technical Data Department, General Motors Proving Ground, was "Lessons Learned by Proving Ground Engineers." Mr. Stonex discussed trends in vehicle characteristics during the last quarter century, and the design as well as utilization of the General Motors Proving Ground.

Vice-President Joseph E. Havenner presided over the Tuesday afternoon Technical Session No. 2 when three interesting and instructive papers were heard. Mr. Edward H. Holmes, Deputy Commissioner of the Bureau of Public Roads, spoke on "National Trends in

Traffic Growth." Mr. Holmes pointed out that vehicle miles of travel have increased at the rate of 5.1 percent per year compounded for the past five years, and that there appeared to be a definite relationship between traffic growth and national economy. Mr. D. Grant Mickle, of the Automotive Safety Foundation, Washington, D. C., delivered a talk on the subject "Traffic Engineering Administration," while the final speaker, Wilbur S. Smith, Traffic Consultant, New Haven, Connecticut, spoke on the problem "Traffic Engineering Consultation."

Wednesday morning the Technical Sessions were split into two groups; one on urban subjects and the other on subjects of statewide interest. Director Karl A. Bevins presided over the urban section and received papers from Mr. J. T. Stegmaier, Research Engineer, Bureau of Public Roads, Washington; Ralph F. Michel, Associate Traffic Engineer, Chicago; and A.T.A. Past President Donald C. Hyde, General Manager, Cleveland Transit System, on the subjects of "Parking As a Factor in Business," "Radio Coordinated Traffic Control Signals," and "Does Mass Transit Have a Future?"

The statewide subjects Session was presided over by Vice-President J. Carl McMonagle. Papers were presented by General George J. Richards, Deputy Secretary, Pennsylvania Highway Department; J. Edward Johnston, Highway Transportation Specialist, U. S. Chamber of Commerce; and California Highway Traffic Engineer George M. Webb, speaking respectively on the subjects of "State Highways of Pennsylvania," "Speed Control and Regulation," and "Accident and Traffic Volumes at Signalized Intersections."

The final Technical Session was held Wednesday afternoon with newly elected President Charles W. Prisk in the chair. This Session was designed to show some of the work of the Institute's Technical Division and was comprised of informal discussions by the seven Department Heads and selected Technical Committee Chairmen on subjects under study by seven of the Committees. The subjects discussed were: "How to Handle Traffic Complaints," by Jerome D. Franklin and James E. Reading; "Civil Service Requirements for Traffic Engineering Positions," by Donald S. Berry; "Policies on One-Way Streets," by Matthew C. Sielski and Walter H. Klapproth; "Parking Meters," by William R. Marston and Ralph H. Sprungman; "Design of Safety Curb and Center Line Devices," by Alger F. Malo; "Policy on Curb Parking," by Edmund R. Ricker and Richard A. Overmyer; "Traffic Survey Devices," by Seymour S. Taylor and John L. Barker. In addition to these Committee reports, Stanley T. Siegel discussed the Traffic Engineer's Technical Notebook.

Special Scheduled Events

A Steel Mill Tour, Kick-Off Luncheon, Biscuit Banter Breakfast, Yale Bureau Alumni Luncheon, Annual Banquet, Headquarters Room activities, tour of new ALCOA building, and Field Trip all greatly enhanced the four-day meeting. The large attendance at each of these special events was a tribute of appreciation the excellent program was entitled to. Sustaining Organizations, national organizations and local industries all contributed heavily to the arrangements of this highly successful Convention.

Approximately 250 men and women were conducted on a tour of the steel mills Monday morning. Buses, furnished by the U. S. Steel Corporation, transported those making the Homestead plant tour. Each person was given a beautiful stainless steel ball point pen.

For the first time the Kick-Off Luncheon on Monday was a mixed affair with 85 ladies joining the 250 members and guests. A number of Pittsburgh and Pennsylvania officials welcomed the registrants to Pittsburgh and figuratively presented keys to the city. General Chairman Michael Gittens, of the Local Arrangements Committee, was Toastmaster.

This year's Biscuit Banter Breakfast was probably the most successful in several years. The entertainment centered around a so-called "Mr. Britto" who, according to first reports, was a parking specialist actively engaged in the conduct of a parking survey in Erie, Pennsylvania. It later developed that he was actually a professional entertainer from Detroit, Michigan, and with the aid of six members, Bill Derrick, Joe Feuchter, Art Reese, Ed Ricker, Bob Schmidt and Wayne Volk he presented a most entertaining program on the art of picking pockets. Wayne Volk lost his belt, Bill Derrick his tie, and Ed Ricker his watch, all without their knowing it, much to the amusement of the audience. Joe Feuchter was the straight man of a demonstration of how to remove a vest without disturbing one's coat, an act that climaxed the hilarious program.

The Yale Bureau Alumni Luncheon was held on Tuesday with 166 alumni and guests present. The alumni were seated at tables according to the year they graduated from the Bureau. Fred W. Hurd, Director of the Bureau, acted as Toastmaster and Merwyn A. Kraft made a few remarks about the Ted Matson Memorial Fund. Bill Corgill was elected General Chairman of the Yale Bureau alumni for the coming year.

Following the close of the technical programs on Monday and Tuesday both men and women retired to the Headquarters Room to engage in frivolous activities. The Local Committee had planned two sessions of a casino party each night and had rented the necessary equipment. Each participant was given an equal stake of play money with which to play any of the several games of chance that were operated. Four two-hour sessions were held and at the end of each session the 10 participants who had accumulated the most play money were given attractive useful prizes ranging from toasters through steam irons and radios to expensive traveling bags. Mr. Robert S. Holmes, of Wald Industries, Inc., assigned numbers to the 24 ITE member or relative winners included in the 40 successful casino contestants and during the annual Banquet conducted a drawing with Past President F. Bruce Crandall of Oregon holding the lucky number. The Prismo Safety Corporation presented Mr. Crandall the Joe Prismo grand prize which was an electrically powered scaled down model of a Ford Thunderbird, suitable for the eight to twelve year old group.

America's first aluminum skyscraper, which is the headquarters of ALCOA and is located diagonally across from the William Penn Hotel, was open all day Tuesday especially for those attending the Annual Meeting. Both the men and women enjoyed this tour immensely.

The traditional Annual Banquet, attended by 358 members, wives and guests, took place Wednesday night after a cocktail party sponsored by the Pittsburgh Motor Club and Lewis W. McIntyre. The Director of Public Safety for the City of Pittsburgh, David Olbum, served as Toastmaster to pay special tribute to the 19 original Institute founders, of which those present, Maxwell Halsey, Harry H. Hemmings, Lewis W. McIntyre, Donald M. McNeil, Burton W. Marsh, Earl J. Reeder and Hawley S. Simpson were recognized and introduced. Each briefly responded with appropriate remarks. Following the introduction of the Institute Officers President Prisk awarded Mr. Burton W.

Marsh, second President of the Institute, an Honorary membership. In acceptance Mr. Marsh spoke of his deep appreciation and concluded his remarks by laying down a challenge to the younger men that will be long remembered by those who were present.

The principal formal entertainment was a brief concert featuring the 33-man chorus of the Homestead District Division of the U. S. Steel Corporation. Signifying their enjoyment the audience demanded encore after encore. The Banquet session concluded with an hour of dancing to the music of the Harry Baker orchestra.

The Annual Meeting was concluded with a Thursday morning Field Trip tour of parking garages, urban redevelopment, expressways and other interesting features of Pittsburgh's resurgence and ended with an inspection of the new $33,000,000 airport where a Closing Luncheon was held in the Horizon Room that normally functions as a night club.

Ladies' Activities

Mrs. Donald M. McNeil, with the assistance of the wives of Pittsburgh members, arranged an excellent program of entertainment for the women. The ladies' program included many of the events of the men's program and, in addition, several special luncheons and tours were planned. Special events for the ladies included a luncheon and tour of the Oakland Cultural Center, a luncheon and tour of the Heinz Company food processing plants, and a tea at the Gateway Center.

Summary

After 25 years and a growth in membership to nearly 1000, it is fitting that the Institute of Traffic Engineers returned to Pittsburgh, the scene of its original organization, to hold the most successful Annual Meeting of its history. Of the 440 male registrants, 60 percent or 260 were members of the Institute. The membership attending the Pittsburgh Meeting represented 27 percent of the 954 enrolled members.

When You Change Your Address

. . . please notify us promptly. Your copies of "Traffic Engineering" will then reach you without delay and without interruption.—Traffic Engineering Magazine, Strathcona Hall, New Haven 11, Conn.

1954 PROCEEDINGS

Now Ready!

CONTAINING ALL TECHNICAL PAPERS

of the

SILVER ANNIVERSARY

KANSAS CITY MEETING

- General Problems
- Rural Traffic Problems
- Urban Traffic Problems
- Joint Session with Businessmen
- Round Table Discussions of Heads of ITE Technical Departments

160 Pages — *Postpaid* $2.00

BACK NUMBERS AVAILABLE

1953 Edition	$1.50
1952 Edition	1.25
1951 Edition	1.00
1950 Edition	Out of Print
1949 Edition	Out of Print
1948 Edition	.50
1947 Edition	.50
1946 Edition	.50
1945 Edition	.50

COMPLETE SETS OF

1945, 1946, 1947, 1948, 1951, 1952 and 1953 Editions
$4.00 Per Set

Send your orders to

INSTITUTE OF TRAFFIC ENGINEERS
Strathcona Hall
New Haven 11, Connecticut

MISCELLANEA

A Secretary Says "Slide, Rule, Slide"

This short article appeared in the August 1955 issue of Highway News published by the Missouri Highway Commission.

What is the Civil Engineer's Bible? Answer: Slide Rule. What's a Slide Rule? Webster says "An instrument consisting of a ruler with a medial slide, ruler and slide being graduated with similar logarithmetic scales labeled with the corresponding antilogarithms."

What now? Medial? Oh that's just an Engineer's middle. You know that strip down the center of a four-lane divided highway? Engineers call that a median strip. Why? it gives it a mathematical and questionable "tinge" . . . and makes it sound difficult. It takes a stab at that pure and simple word called MIDDLE.

Next — Logarithm — what's that? Again let's go back to Webster—and those Greeks who liked to sit on the log and think. They developed that word. It's logos + arithmus, or proportion + number. Websterly and mathematically, it's the exponent of that power of a fixed number (called the base) which equals a given number called the antilogarithm.*

*Anti is Latin for "against" and assuming one log increased to the 2nd power is placed opposite (or against) a log with a given number of 4—we would have the equation of

$$L^2 = 4$$

the value of one Log would then be 2.

More confusion? Exponent (algebraically) is that symbol written above another symbol in that elevated position to the right denoting how many times the latter is repeated as a factor. What's a symbol???? Any kind of a sign—for example—Winston Churchill had that sign V for victory. The Engineer uses x, and sometimes a, b, c—these are merely suppositional. For example X^2 means that X is to be repeated like 2x2. There is always that unknown x quantity. And what does it add up to

Well if $x^2 = 4$
x repeated is 4
If x repeated is 4
Then x must be 2, because
only 2x2 equals 4
"I knew it all the time"
When 2 drunks get twice as drunk as
they are—answer,
4 drunks.

POSITIONS AVAILABLE

CITY OF JACKSON MICHIGAN

TRAFFIC ENGINEER OR TRAFFIC ANALYST

Must have thorough knowledge of traffic laws, modern traffic safety practices, and ability to organize and conduct traffic surveys. Salary open, depending upon training and experience.

Apply:
Personnel Office
121 North Mechanic Street
Jackson, Michigan

CITY OF MADISON WISCONSIN

ASSISTANT TRAFFIC ENGINEER

For traffic engineering department just recently established.

REQUIREMENTS: Registration as a professional engineer. Experience in the field of city traffic engineering and traffic control, and graduation from a college or university or recognized standing in any field of engineering.

SALARY: $554 to $624 per month.

Write:
Personnel Department
City Hall
Madison 3, Wisconsin

CITY OF SAN ANTONIO TEXAS

ASSISTANT TRAFFIC ENGINEER

SALARY: $400-$505 per month.

REQUIREMENTS: Graduate engineer with two years of traffic engineering experience preferred.

Apply:
Mr. F. S. Manuppelli
Director of Personnel
City Hall
San Antonio, Texas

CITY OF: Kitchener, Ontario, Canada
MAY EMPLOY: First Traffic Engineer
WRITE: M. MacKenzie, Personnel Director, City of Kitchener

CITY OF: Tyler, Texas
NEEDS: First Traffic Engineer
SALARY: $6000
WRITE: C. P. Stewart, City Manager

CITY OF SPRINGFIELD MASSACHUSETTS

TRAFFIC ENGINEER

To direct an established Bureau of Traffic Engineering. Eight-year-old ordinance creating Bureau requires the Mayor to make appointment subject to confirmation by Aldermen, and specifies that appointee must be graduate of a recognized traffic engineering school, at least 25 years old, with not less than 3 years practice of traffic engineering, one year of which he must have been in responsible charge.

SALARY: $6300 to $7560 annually dependent upon age and qualifications.

Write:
Daniel B. Brunton, Mayor
City Hall
Springfield, Massachusetts

NEW YORK STATE THRUWAY

Junior Civil Engineers and Assistant Civil Engineers to be employed by New York State Thruway in Elmsford, Albany or Syracuse.

SALARY: Junior Civil Engineers $4350-$5460 per year. Assistant Civil Engineers $5360-$6640 per year.

DESCRIPTION: The positions will involve considerable field work and vehicles would be furnished by the Authority.

Apply:
Arnold G. Fisch, Traffic and Safety Engineer
New York State Thruway Authority
Albany, New York

CITY OF: Midland, Texas
NEEDS: Traffic Engineer
SALARY: Open
WRITE: City Manager, City of Midland, P. O. Box 831

CITY OF: Racine, Wisconsin
NEEDS: First Traffic Engineer
SALARY: Not more than $7500
WRITE: Mayor Jack H. Humble

SECTION NEWS

NEW ENGLAND SECTION

The election for officers was polled in August and the following were duly elected for the year 1955-56: President, **Fred W. Hurd**; Vice-President, **David S. Johnson**; Secretary-Treasurer, **Roger T. Chandler.**

Delegates to the Connecticut Technical Council will be as follows: **Earl H. Flynn**, Delegate, and **Fred W. Hurd**, Alternate.

David S. Johnson
Secretary-Treasurer 1954-55

INDIANA SECTION

Excerpts from the Indiana Section News Letter, **Donald W. Barry**, Editor.

The summer quarterly meeting of the Indiana Section was held on June 24, 1955. The meeting was called to order by **Jim White** due to the absence of President **Jim Neff.**

Plans were discussed for a possible field and inspection trip of the East-West Indiana Toll Road. It was further discussed that the Indiana Section might act as host for District No. 3 at some future date.

An Inspection Committee was appointed and this Committee consisted of **Elmo Stuckey, Jim White** and **Douglas Carmody.**

The next Indiana Section meeting was scheduled to be held at 4:00 P.M. on September 19 preceding the District 3 meeting in Toledo, Ohio.

John Baerwald, Vice-President of the Indiana Section, has accepted the position of Highway Engineer at the University of Illinois. The Indiana Section's loss is the Midwest Section's gain. Good Luck, John.

MIDWEST SECTION

Snipped out of Midwest Items, **Dick Walons**, Editor.

Woodmar Adventure

Saturday, August 13th, was the day and 1 P.M. was the hour for the Midwest Section's annual outing at Woodmar, "Squire" **Bill Marston's** woodland refuge near Woodstock, Illinois. Over 30 local section members and their families and friends enjoyed a day replete with swimming and sunning, feasting and funning. It would be redundant, ambiguous, and perhaps garrulous to say that a good time was had by all, but that is just the case. It was surprising to see so many children, and adults too, enjoying themselves with uninhibited enthusiasm and still maintaining an air of tranquil harmony. This was probably due in no small part to **Bill** and **Marge Marston** who kept all the little, and big, mouths so full of hamburgers, hot dogs, potato chips, ice cream, pop, and beer (for the big mouths, that is) that not a discordant note (or child) was struck all day.

CTA Challenged

Chicago's Bureau of Street Traffic has invaded the bowling world. Two teams of traffic engineers have entered the Bureau of Engineering league, and threaten (or hope to, anyway) to dethrone CTA as top traffic bowling team.

Team members include **Bob Harris, Jim Hunnicutt, Mike Hartigan, Don Crowell, Charlie McLean,** and **Dick Walons** on one, and **Barney O'Halleran, George Kloac, Joe Kim, Joe Battaglia, George Marasovich,** and **Frank Ostrowski** on the other.

They will compete with the CTA team composed of **Evan Omlstead, Fred Potenza, Vince Donahue, Frank Barker, Jr.,** and **Frank Barker, Sr.** CTA has been in the league three years and won one championship.

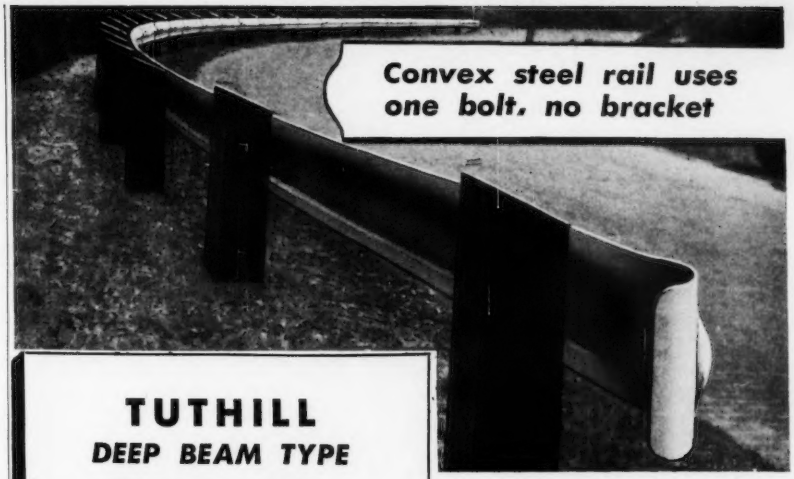
Wanted: Imagination

Tests recently completed on Washington Street in Chicago's Loop show some interesting variations in vehicular speeds as related to timing of traffic signals. All told, nine different timing plans were tried including 25%, 50%, 75% and 0% offsets, alternating pairs, alternating quadruplets and a few special sequences developed by Chicago Transit Authority engineers.

Some of the plans tried would probably horrify the conformists in our midst. The truth is that under certain conditions the most unlikely looking schedules did the better jobs of moving traffic.

While details of the survey would take too much space to publish, here are some highlights. During the morning rush period the 25% offset, which should move traffic at 17 miles per hour, was best for automobiles and buses. Average speeds were 9.2 and 5.3 miles per hour, respectively. At noon the 50% offset was good for both autos and buses. Speeds were 7.4 and 5.0 miles per hour, respectively. During the afternoon rush one of the CTA special plans turned out advantageous. Offsets between intersections were all over 60% and in one case 90%. Speeds were 5.4 miles per hour for autos and 4.4 miles per hour for buses.

Speeds recorded under the best plans are astonishing because they are so low. However, the moral of the story is that the answers to signal timing problems aren't always found in textbooks, or on



TUTHILL
DEEP BEAM TYPE
GUARD RAIL
cushions shock . . .
deflects cars safely

TUTHILL deep beam construction transmits impact to guard post, deflects and protects vehicle and occupants. Convex rail, secured to post with a single bolt, meets "deep beam" specifications . . . costs less to install, cuts maintenance. TUTHILL'S convex curve also gives highest visibility in darkness, rain or fog.

TUTHILL SPRING CO.

WRITE TODAY for complete brochure

760 WEST POLK STREET • CHICAGO 7, ILLINOIS

slide rules. Certainly an unimaginative conformist would never dare try retrogressive timing.

All of this applies to other things traffic engineers do. Too frequently we reject the best solution to a problem because of reluctance to depart from convention.

Progress in Parking

Last month saw the opening of two more City of Chicago parking facility garages. This brings the total of operating parking garages to seven of the nine planned for Chicago Loop and Near North Side.

Parking Facility No. 3, a ramp type garage located at State and Congress Streets, was opened to the public on August 3rd. It has four parking levels and a capacity of 665 cars. It is expected to accommodate the heavy parking demand in the South Loop area and to provide convenient parking for users of Congress Street Expressway now under construction.

On August 23rd, the Near North Side welcomed opening of Parking Facility No. 5 on Delaware Place between Rush Street and Ernst Ct. A hoist type garage with eight parking levels, it has a capacity of 420 cars. It is expected to attract businessmen and parkers from the North Michigan Avenue business area.

This leaves but two facilities to be completed in this area. Nos. 4 and 6, at 560 North Rush Street and at St. Clair and Superior Streets, respectively, are under construction at the present time. They are expected to be completed in summer, 1956, and will provide 2,206 more needed parking spaces.

Award Luncheon

Several hundred persons, whose efforts are directly concerned with Chicago's traffic safety program, saw Mayor **Richard J. Daley** accept two significant awards to the city at a luncheon in the Grand Ballroom of the Sherman Hotel on July 29th. **Ned H. Dearborn,** president of the National Safety Council, and **Harry Porter,** ITE national president, made the awards to Mayor Daley for Chicago's excellence in traffic safety and traffic engineering, respectively. Thus Chicago scored an enviable sweep in traffic awards for cities in the over 1,000,000 population group.

Sign Tests

The Traffic Subcommittee of the Expressway Design Committee held their most recent test in a continuing series of sign tests, on the completed portion of the West Route Expressway in Maywood on Thursday, August 18th. A control group of 18 non-traffic engineering personnel were driven over a measured course on the westbound express roadway between Ninth Avenue and 17th Avenue observing and recording their reactions to various signs hung from the 17th Avenue bridge. Their reactions involved target value and pure legibility distances for six different signs under conditions of daylight and darkness.

The six signs represented the products of three different manufacturers of reflective materials, each of whose letters appeared on two signs, one with and one without a reflectorized background. The messages consisted of five words, each containing three letters, none of which made sense, but which were basically pronounceable.

Puzzle Corner

A young traffic engineer had designed a channelizing island in the shape of a perfect right angled triangle.

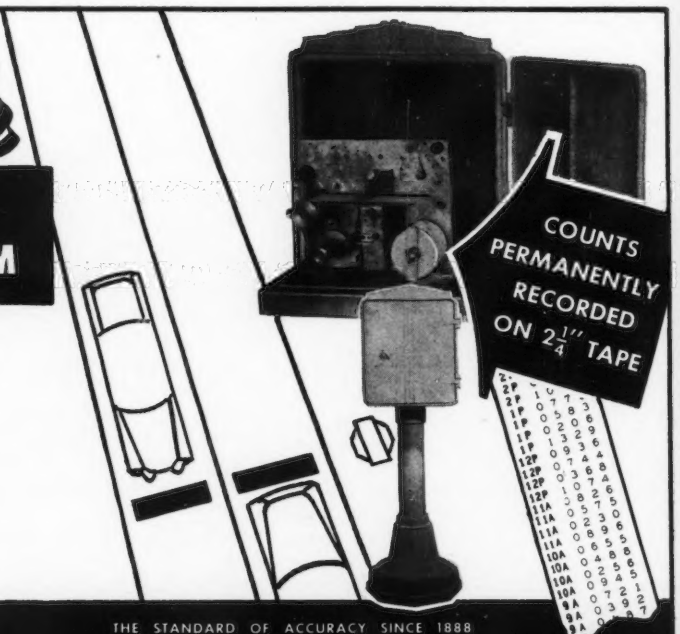
He did not specify its dimensions but did state that its area was 336 square feet and that the perimeter was eight times the length of the shortest side.

What are the lengths of each side of the triangular island?

Ametron®

TREADLE ACTUATED TRAFFIC COUNTING SYSTEM

- Rugged permanent year round installation
- Counter can be used with new or existing treadles
- Prints totals each hour and resets to zero
- Count identified with time of day
- Counter housed in rugged weather proof housing
- Will count vehicles traveling in excess of 80 MPH
- Counter capable of 1000 counts per minute
- 115 volt 60 cycle operation
- Power failure indicator optional
- Day of week symbol optional



THE STANDARD OF ACCURACY SINCE 1888

STREETER-AMET COMPANY

4101 RAVENSWOOD AVENUE • CHICAGO 13, ILLINOIS

Branches in Detroit, Pittsburgh, Allentown, Birmingham and Los Angeles

Toronto, Ontario—E. A. Horton Sales Co., 3071 Bloor St., West

BORROWMAN MOVES

(Continued from page 82.

in civic affairs, as a member of the town planning commission and the public parks board in the residential suburb of St. Vital. For relaxation he plays a little golf, and under the direction of his better half, attempts to keep up with the wails and wiles of four active school age offspring (two of each kind).

EDWARD A. MUELLER

(Continued from page 82)

ties in addition to ITE include membership in the American Society of Civil Engineers and National Society of Professional Engineers. Ed also is an Associate Editor of TRAFFIC ENGINEERING, has written short articles for the magazine and has edited the latest Proceedings. Ed's hobbies are aviation and photography.

W. M. PARKER

(Continued from page 83)

Macon-Bibb County in May 1953, with the work being completed this past July.

Parker worked most of 1954 as Resident Engineer for the Automotive Safety Foundation on a highway needs study in the State of Tennessee. He returned to Atlanta late in the fall to supervise the completion of the Macon-Bibb County Survey which had been more or less dormant.

For the beginning of his activities in Macon, the City and County Officials have submitted suggestions of the most urgent traffic problems through the Planning and Zoning Commission. Parker will concentrate on clearing up these problems first. He will then confine most of his activities on ways and means to generally improve the traffic situation within the area as well as to fit in the future recommendations with the overall plans of State, Federal and Local agencies.

Mr. Parker is a member of the Institute of Traffic Engineers and is registered to practice Civil Engineering in Georgia and Florida. He served a short time with the U. S. Marine Corps in World War I, training as an aviation cadet, preparing for a flyer's commission. The war ended before accomplishing this objective and he returned to railroad engineering.

Mr. Parker and his wife now reside at 3831 The Prado in Macon. They have a married daughter who lives in Tampa, Florida, and a married son who is a commercial freight pilot, working out of San Antonio, Texas.

"...And, we like your new catalog. It helps to have the entire story on a line as complete, and competitive, as Grote's!"
There's a GROTE SIGN for every signing need!

GROTE ENAMELED SIGNS are made of heavy gauge, rustproof steel . . . finished with three coats of enamel, each separately baked. No chipping, cracking, spall! Letters are screen processed. Attract motorists' attention instantly . . . easily, quickly read!

GROTE REFLECTORIZED SIGNS have Grotelite SS reflective sheeting on aluminum or steel. Provide maximum target value . . . greatest advance warning to motorist. Made of optical acrylic plastic, Grotelite sheds water, withstands all weather extremes.

* *Grotelite SS is also available in sheets, precut to size . . . in yellow, red, green and silver (white).*

Send Today for Catalog No. 754-T . . . and for Complete Facts on Grote's Reflectorized and Enameled Signs.

Before ordering again . . .

SHOULDN'T YOU EXAMINE THESE FACTS ON GROTE SIGNS?

- **Maximum Attention Value!**
- **More Years of Effective Service!**
- **Extra Strength and Durability!**
- **Guaranteed Waterproof, Colorproof Finish!**
- **Complete Sign Line!**

THE GROTE MANUFACTURING COMPANY, INC.

ESTABLISHED 1901 • BELLEVUE, KENTUCKY • OPPOSITE CINCINNATI

JOHN E. BAERWALD

(Continued from page 82)

urer and is now Vice-President of the Indiana Section.

He is a registered professional engineer and is a member of the American Society of Civil Engineers, the Highway Research Board, the Society of American Military Engineers, Sigma Xi, and Chi Epsilon.

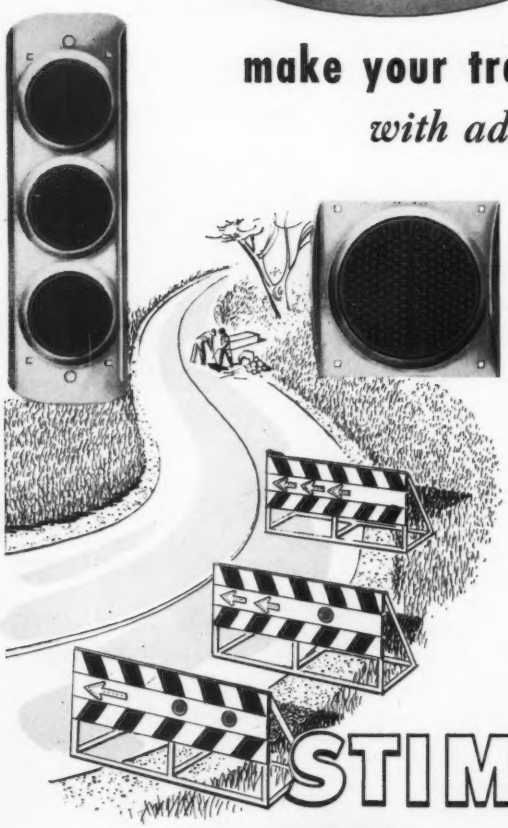
Mrs. Baerwald—Elaine—is also from Milwaukee and helps John keep track of their three children — five-year-old Tom, three-year-old Jim, and four-months-old Barbara. Sports and enjoying people occupies most of their spare time.

LOOKING AHEAD

DECEMBER 4-10—NEW ORLEANS, LOUISIANA
Annual meeting of the American Association of State Highway Officials.

JANUARY 11-14, 1956—MIAMI BEACH, FLORIDA
Annual convention of the American Road Builders' Association.

15 inch cluster of six 3 inch Stimsonite reflectors.



make your traffic markers on the spot

with adaptable

STIMSONITE

reflectors

Have highway warning signals always available to meet the changing needs of a construction project or for regular maintenance operations. A few handfuls of sealed Stimsonite reflectors in metal holders, plus a small stock of reflectorized arrows and cutout letters, and it's simple to make an almost unlimited choice of traffic markers on the spot, to fit the job.

Stimsonite gives you the most brilliant warning signal and the greatest durability of all reflective materials. The smooth curved surface of a sealed Stimsonite reflector washes clean. No dust or moisture can penetrate and the molded-in deep colors can't possibly fade. Simply attached by the use of wood screws through the housing, these reflectors can be removed and re-used time and again. Just a few types of metal housed Stimsonite reflectors are shown above. For full details, get in touch with A'G'A Division of Elastic Stop Nut Corporation of America, 1027 Newark Avenue, Elizabeth 3, New Jersey.

STIMSONITE® *for* *Seeability* / *Readability* / *Durability*

AGA DIVISION

ELASTIC STOP NUT CORPORATION OF AMERICA

1027 NEWARK AVENUE, ELIZABETH 3, NEW JERSEY

"Pigeon Hole" Garage For New Haven

A 304-car "Pigeon Hole" garage presently under construction in New Haven, Conn., is part of a parking project of 468-car capacity. This garage sets a mark in two ways. It is the first "Pigeon Hole" to be built for a municipal agency and it is the New Haven Parking Authority's first garage. Three other facilities owned by the New Haven Parking Authority are lots of approximately 100-car capacity each. The present project is estimated to cost $900,000; $420,000 for land acquisition and $480,000 for construction. It is anticipated that it will serve approximately 350,000 cars yearly. The project as planned includes the garage and two parking lots which provides access from three streets. Entry will be made from any of three streets and the parker will have the option of leaving his car on the ground or having it placed in the Pigeon Hole structure. A rate schedule has been adopted which encourages all-day parkers to remain on the ground and short-term parkers to use the garage facility. In this manner it is planned to spread the peak hour exit loadings throughout the project and avoid concentration of the loading at the garage exit point.

The site of the garage was formerly a parking lot owned by the Parking Authority. For some time there had been plans to acquire additional properties and construct a garage thereon. The decision to construct a mechanical facility arose from the site dimensions, which consisted of only 94 ft. frontages for the maximum width lot. The garage itself is 58 ft. in width and 143 ft. in length. It will contain three elevators and eight tiers of parking.

Actual construction of the facility began July 13, 1955, at which time ground was broken for the foundation. All foundation work was completed by late August, after which there was some delay due to disruption of normal transportation services in Connecticut from the mid-August floods. Steel erection got underway in late September and it is anticipated that the garage will be in operation before the end of October.

Financing of the project was accomplished through New Haven Parking Authority 30-year revenue bonds, sold at 3¼% interest during the month of August. The amount of the bond issue was $1,200,000 which amount provided necessary funds for the facility with necessary reserves and the consolidation of all outstanding Parking Authority obligations. To support the bonds, which do not constitute a debt of the city, the city pledged the backing of its entire curb meter revenue, which amounted to some $184,000 during the past year. These revenues are held in reserve on a month to month basis, to be applied only when and if project revenues are insufficient. Engineering estimates for the facility indicate that project revenues will be more than 1½ times the amounts needed for operating and capital expenses.

CONFERENCE HELD ON CALIFORNIA VEHICLE CODE

(Continued from page 80)

crosswalks adjacent to school locations. A new section which was added to the Vehicle Code requires that all crosswalks and approach warning markings adjacent to school locations be painted yellow and that yellow crosswalks shall not be used at any other location.

Mr. Braff discussed the new section of the Vehicle Code which permits the use of the "Yield Right-of-Way" sign in the State of California. In his discussion, Mr. Braff pointed out the advantages of the use of this type of sign and cited examples of locations where the sign could materially aid the traffic engineer in controlling conflict without unduly impeding traffic flow.

Mr. Havenner discussed the Vehicle Code admendments relating to the placement and use of traffic control signals. One of the amendments cited permits local authorities to place and maintain official traffic control devices at the intersection of a public roadway and a private road where consent of the owner of the abutting property is obtained. The need for traffic control devices in such locations has been demonstrated in Southern California at principal entrances to large aircraft installations and other large industrial establishments. Another amendment which was discussed permits the State or local authorities to consider streets intersecting a major artery within 200 feet as comprising a single intersection, for the purpose of installation and operation of traffic control signals, when appropriate markings are placed to indicate required compliance with such control devices.

There were 109 persons in attendance at the conference, including representatives of 27 cities and two counties, the State of California, the United States Air Force and 16 additional governmental agencies and private organizations.

SAFE-T-CONE

Patent Pending

ALL-RUBBER TRAFFIC GUIDES

Wherever traffic control becomes difficult . . . during rush hours, street repair or emergency, these big, "steel-like" rubber traffic cones demand motorists respect. Available in two sizes, 18 inch and 28 inch, painted or reflectorized.

Manufactured by

RADIATOR SPECIALTY COMPANY

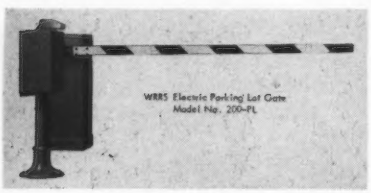
CHARLOTTE, NORTH CAROLINA

2016

Strictly Business

Mechanical Parking Lot "Attendant"

To combat the problems which are handicapping the growth of off-the-street parking, Western Railroad Supply Company has designed and built an electric parking lot gate which eliminates labor costs and provides foolproof parking lot control.



Lots at airports, hospitals, schools, industrial plants, suburban railroad stations, shopping centers, and downtown lots in off-hours find it almost impossible to survive with constantly mounting costs. Even parking meters in off-the-street lots fail to eliminate labor costs, for the monthly maintenance costs for parking meters in Chicago, for example, has averaged over $1.00 per meter. This would involve a labor cost of over $100.00 a month on a 100-car lot.

Installation of WRRS Elctric Parking Lot Gates (Model No. 200-PL) eliminates labor and requires collection at only one or two coin boxes, depending upon the arrangement.

The operation is simple. The driver stops at the gate and, without leaving the car, deposits a coin in the coin box. This actuates a three-way positive magnetic control which opens the gate to admit the car, closes the gate when the car clears, and positively protects against the gate coming down on the car. The control of the gate is timed to prevent the passage of more than one car in each operation.

WRRS Gates are manufactured by Western Railroad Supply Company which has manufactured ten thousand electric crossing gates for more than a hundred Class I American railroads. For detailed information and price list write to: Western Railroad Supply Company, 2428 South Ashland Avenue, Chicago 8, Illinois.

New Movie Available

Good highways are of vital concern to the automobile driver, the public passenger carrier and the general public. A new motion picture entitled "Road Block," produced by Caterpillar Tractor Co., is aimed at alerting the public to one of the nation's most critical needs.

The film depicts the fact that everyone agrees that the public should have good roads—the housewife wants safe highways, the traveling salesman wants better superhighways, the farmer wants better farm-to-market needs. Who should come first is the question asked in the film.

In developing the story, the film portrays the personal interest of each type of person involved. The objections they make are answered by a series of authorities whose comments are interjected without personal reference to the individual.

A trucking company reports on the tremendous losses incurred by bruising produce enroute to market, a highway engineer explains what a modern highway is, another authority is quoted concerning the price paid for good highways whether or not they are built.

Though such selfish interests must be considered, the film points out that the program can only succeed through cooperative action. Only by planning and discussion can progress be made on this problem which is rapidly approaching a national emergency.

The new color film "Road Block" is 20 minutes in length.

Flourescent Street Light

Development of the world's largest fluorescent street light—designed specifically for use on the nation's widest urban thoroughfares—has been announced by General Electric's Outdoor Lighting Department at Lynn, Mass. Designated the Form 1206, the giant fluorescent luminaire employs 12 six-foot Rapid Start lamps and generates more than 64,000 lumens—three times the light output of the largest existing fluorescent luminaires.

The luminaire is mounted on a pipe tenon entering about 3 feet through a slip-fitter casting. Termination of the pipe is in another casting so arranged to permit a leveling adjustment of 3°. Air is drawn in through the bottom of the globe to a central chimney running the length of the unit. Other openings permit outside air to enter for cooling of the ballasts mounted about the lamps. Top vents help to exhaust the air. All openings are covered with either fine-mesh screens or perforated metal to exclude insects. The huge luminaires are engineered and designed to provide a quality of illumination previously unavailable for America's Main Street.

Traffic Signal Identification

A new concept of traffic signal identification, a rapidly pulsing red light, has been offered as a possible solution to the increasing number of automobile accidents caused by drivers not seeing traffic signals.

The new identification, "PULSATING RED," operates on a fourth section set above the red indication on a standard traffic signal (see photo), or directly to the red indication itself.

The rapid pulsing of the light, 340-420 pulses per minute, catches the driver's eyes from greater distances thus preparing him much sooner to take the necessary action to stop safely.

Actual installation tests have proved that "PULSATING RED" stands out effectively against a distracting background of electric signs and is not affected or washed-out by the sun.

Southern Signals, Inc., Shreveport, La., originator of the new concept, believes that drivers don't willfully run red lights—they just don't see them; and, "PULSATING RED" can reduce the number of accidents because the pulsing light commands driver attention.

Smiles a Welcome Both Night and Day

State Entrance signs of "SCOTCHLITE" Reflective Sheeting extend a full color greeting to visiting motorists

All around the clock, State Entrance signs like the one above greet every visiting motorist with a *warm, bright smile!* By day, these crisp, sparkling signs of "Scotchlite" Sheeting extend their friendly message clearly . . . and the greeting doesn't disappear at dark. At night, where ordinary signs grow indistinct, signs of "Scotchlite" Sheeting really show their merit. Caught in the beam of approaching headlights, these signs *reflect light* back to the driver on the road . . . your message of greeting is delivered *in vivid full color,* just as it was during the day.

Signs of "Scotchlite" Reflective Sheeting are economical, too . . . there's no painting, and very little maintenance. Mounted on any hard, smooth surface, they'll outlast at least two proper paint cycles on an ordinary sign. Look into the advantages of "Scotchlite" Sheeting now. We'll be glad to send a FREE miniature State Entrance sign for *your* state. Ask the "3M" representative in your area, or write: Minnesota Mining & Manufacturing Company, Dept. GS-115, St. Paul 6, Minnesota. There's no obligation, of course.

FOR SHAPE . . . COLOR . . . LEGIBILITY

REG. U. S. PAT. OFF.

SCOTCHLITE

BRAND

REFLECTIVE SHEETING

The terms "Scotchlite" and "Flat-Top" are registered trademarks of Minnesota Mining & Mfg. Co., St. Paul 6, Minn. General Export: 99 Park Avenue, New York 16, N. Y. In Canada: P. O. Box 757, London, Ontario

Statement Required by the Act of August 24, 1912, as Amended by the Acts of March 3, 1933, and July 2, 1946 (Title 39, United States Code, Section 233) showing the Ownership, Management, and Circulation of Traffic Engineering, published monthly at Plainfield, New Jersey.

1. The names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher—Institute of Traffic Engineers, Inc., Strathcona Hall, New Haven, Conn.

Editor—M. Mansfield Todd, Strathcona Hall, New Haven, Conn.

Managing editor—Adolf D. May, Jr.

Business manager—None.

2. The owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding 1 per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a partnership or other unincorporated firm, its name and address, as well as that of each individual member, must be given.)
Institute of Traffic Engineers, Inc., Strathcona Hall, New Haven, Conn.

3. The known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. Paragraphs 2 and 3 include, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting; also the statements in the two paragraphs show the affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner.

5. The average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the 12 months preceding the date shown above was: (This information is required from daily, weekly, semi-weekly, and tri-weekly newspapers only.)

INSTITUTE OF TRAAFIC ENGINEERS, INC.
OSMUN FORT
Agent of the Publisher

Sworn to and subscribed before me this 30th day of September, 1955.

[Seal]

WILLIAM L. CHRISTIAN,
Notary Public of N. J.
(My commission expires April 1st, 1958)

INDEX TO ADVERTISERS

A'G'A Division of Elastic Stop Nut Corporation 92
G. M. Basford Company, New York, New York

Automatic Signal Division of Eastern Industries, Inc. 78
Remsen Advertising Agency, Inc., New Haven, Connecticut

Crouse-Hinds Company ..... **Inside Front Cover & 53**
Barlow Advertising Agency, Inc., Syracuse, New York

Dual Parking Meter Company 56
Griswold-Eshleman Co., Cleveland, Ohio

Duncan Parking Meter Corporation 77

Eagle Signal Corporation 79

Grote Manufacturing Company, Inc. 91
Peck-Heekin Advertising, Cincinnati, Ohio

Magee-Hale Park-O-Meter Company 54
The McCormick-Armstrong Co., Wichita, Kansas

Minnesota Mining & Manufacturing Company 95
Ruthrauff & Ryan, Inc., St. Paul, Minnesota

Miro-Flex Company, Inc. 96
Associated Advertising Agency, Inc., Wichita, Kansas

Prismo Safety Corporation ..... **Back Cover**
Michener & O'Connor, Inc., Harrisburg, Pennsylvania

Radiator Specialty Company 93
Bennett-Evans Company, Charlotte, North Carolina

Streeter-Amet Company 90
Brandt Advertising Company, Chicago, Illinois

Tuthill Spring Company 89
Burlingame-Grossman Advertising, Chicago, Illinois

Wald Industries, Inc. ..... **58, 74 & 75**
Michener & O'Connor, Inc., Harrisburg, Pennsylvania

LINCOLN
N SHERIDAN
YIELD
ONE WAY
STOP
US
25
SCHOO
15 M.P
Signs of a Wise Investment
EMBOSSED SIGNS BY MIRO-FLEX
When you invest in Miro-Flex signs, you're sure of getting your money's worth... and you're sure that it will be an investment that will last a lifetime. That's because Miro-Flex signs are embossed... actually made for tomorrow's traffic as well as today's. Embossed signs are stronger and they are more legible. To top it off, Miro-Flex signs are finished with the best baked-on enamel on zinc-coated Bonderized steel. Be sure you have your free copy of the Miro-Flex sign catalog as a ready reference.
WRITE TO
THE
MIRO-FLEX
CO., INC.
1824 EAST SECOND ST. WICHITA, KANSAS

Professional Service Directory

EDWARDS, KELCEY and BECK
CONSULTING ENGINEERS

Surveys — Reports — Economic Studies — Design — Supervision
Transportation — Traffic — Parking — Terminals — Port and Harbor Works
Highways — Expressways — Grade Separations — Tunnels
Bridges — Water Supply — Management

3 William Street, Newark 2, N. J. • **250 Park Avenue, New York 17, N. Y.**

GANNETT FLEMING CORDDRY and CARPENTER, INC.
- - - ENGINEERS - - -

CONSULTING SERVICE FOR TRAFFIC, PARKING and TRANSPORTATION PROBLEMS
City Planning — Highways — Bridges — Flood Control
Water Supply — Sewerage— Industrial Waste — Garbage Disposal
Appraisals — Investigations — Management

600 NO. 2nd STREET HARRISBURG, PA.
Pittsburgh, Pa. Philadelphia, Pa. Daytona Beach, Fla. Medellin, Colombia, S. A.

PALMER AND BAKER, INC.
CONSULTING ENGINEERS — ARCHITECTS

Surveys — Reports — Design — Supervision — Consultation
Transportation and Traffic Problems Tunnels Bridges Highways Airports
Industrial Buildings Waterfront and Harbor Structures
Graving and Floating Dry Docks
Complete Soils, Materials and Chemical Laboratories

Mobile, Ala. **New Orleans, La.** **Harvey, La.**

TIPPETTS — ABBETT McCARTHY — STRATTON
Engineers
Traffic, Parking and Transportation
Surveys, Economic Studies and Financial Reports
Highways, Subways, Bridges, Tunnels—Airports, Ports, Harbors, Power Developments, Water Supply, Sewerage
Planning, Reports, Design, Supervision of Construction

62 West 47th St. New York 36, N. Y.
110 Market St. San Francisco 11, Cal.

YOUR CARD

could be set in this space at a very reasonable rate.

If interested, please write
TRAFFIC ENGINEERING
211 Strathcona Hall
New Haven 11 Connecticut

TRANSPORTATION PROBLEMS
HIGHWAYS

THE CLARKESON ENGINEERING COMPANY
INCORPORATED

285 Columbus Ave., Boston 16, Mass.
COmmonwealth 6-7720

EXPRESSWAYS **AIRPORTS**

AMMANN & WHITNEY
CONSULTING ENGINEERS

Design and Supervision of Construction of Bridges, Highways, Expressways, Buildings, Special Structures, Airport Facilities.

111 Eighth Avenue, New York 11, N. Y.
724 E. Mason Street, Milwaukee 2, Wisc.

HARDESTY & HANOVER
CONSULTING ENGINEERS

BRIDGES — Long Spans of All Types
Movable — Lift, Bascule & Swing
Hanover Skew Bascule
Grade Crossing Eliminations
Other Structures Foundations
Expressways and Thruways
Design — Supervision — Inspection
Valuation — Reports

101 Park Avenue **New York 17, N. Y.**

Highway Traffic Engineers, Inc.
345 Boylston Street
Brookline 46, Massachusetts
LOngwood 6-0275

PARSONS, BRINCKERHOFF HALL & MACDONALD
Engineers
Bridges, Highways, Tunnels, Airports, Subways, Harbor Works, Dams, Canals, Traffic, Parking and Transportation Reports, Power, Industrial Buildings, Housing, Sewerage and Water Supply.

51 Broadway **New York 6, N. Y.**

DE LEUW, CATHER & COMPANY
CONSULTING ENGINEERS

Transportation, Public Transit and Traffic Problems
Subways, Railroads, Industrial Plants
Power Plants, Grade Separations,
Expressways, Tunnels, Municipal Works

150 N. Wacker Drive, Chicago 6, Ill.
79 McAllister St., San Francisco 2, Cal.

S. Herbert Taylor Frank J. Sleeper
David L. Taylor William H. Taylor

SHERMAN, TAYLOR & SLEEPER
CONSULTING ENGINEERS

501 Cooper Street, Camden 2, N. J.
EMerson 5-0555
Park & Norwod Aves., Pennsauken 8, N. J.
MErchantville 8-4848

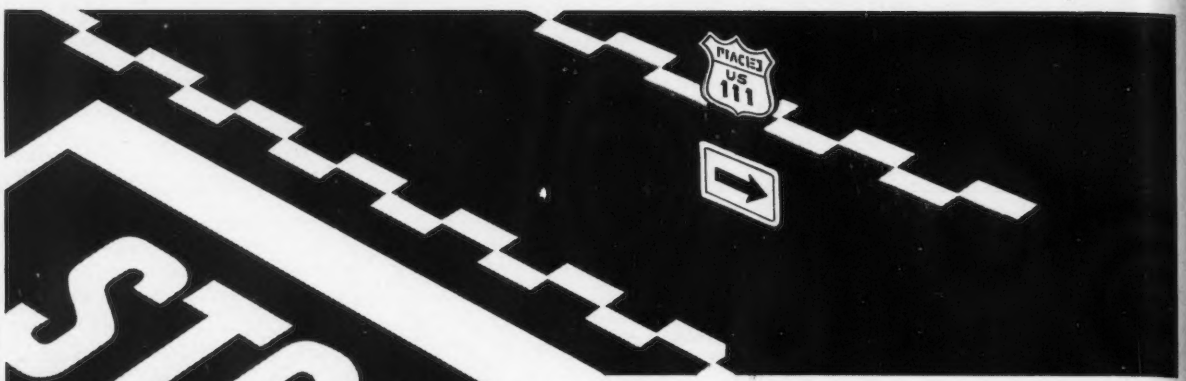
MATTHEW CAREY
MUNICIPAL FINANCE CONSULTANT

Specializing in Financing
Off Street Parking Facilities
Financial Advisor in Connection with Highland Park, Royal Oak, Wyandotte, Michigan and Kankakee, Illinois Automobile Parking System Revenue Bond Issues

Box 3703 Kercheval Station
Detroit 15, Michigan

JENKINS, MERCHANT & NANKIVIL
Consulting Engineers
Municipal Improvements Sewerage
Power Development Water Systems
Traffic Surveys Industrial Plants
Flood Control Recreational Facilities
Airports Investigations and Reports

805 East Miller Street
Springfield, Illinois



Daylight bright on the darkest night

Longer lasting too!

and for signs . . . revolutionary new

PRISMO '200' Hi-REFLECTIVE FINISH

Here's the all-in-one reflective finish developed to brilliantly answer every reflective sign requirement. Complete angularity, with the highest refractive index ever attained —Prismo '200' is the last word in reflectivity . . . the first to be seen and *read* on a darkened highway.

PRISMO PLASTIX

. . . the most durable reflective marking material you can use on your city streets! Made of extruded thermoplastic material impregnated throughout with highly-reflective glass spheres, Plastix actually becomes a part of your street surface and lasts indefinitely. Plastix is applied easily and quickly in strips, dots or legends. Brilliant, 24-hour protection for your intersections, crosswalks and school zones!

Write today for free copy of bulletin No. PX-53.

PRISMO
SAFETY CORPORATION
Huntingdon, Pennsylvania

1837